

INFO WORLD

THE
PC
NEWS
WEEKLY

PRODUCT COMPARISON
PRESENTATION GRAPHICS

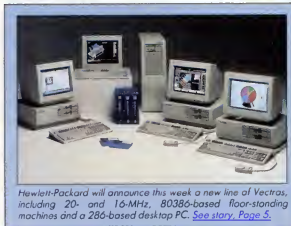
Lotus Finally Drops Copy Protection

By Edward Warner

CAMBRIDGE, MA — Although many users reacted with cheers as Lotus last week revealed it would drop copy protection from upcoming releases of 1-2-3 and Symphony, some corporate PC professionals were uneasy about the move.

Lotus officials said 1-2-3, Version 3.0 and Symphony 2.0 will not be copy-protected, but the company stopped short of saying all future products would be unprotected. While the company has made no decision to lift copy protection from existing versions of 1-2-3 or Symphony, spokesman Greg Jarboe hinted that it would not do so. "Copy protection [removal], by itself, is not worth the pain and suffering of going through an upgrade," he said.

Industry analyst Mike
[Continued on Page 117](#)



Hewlett-Packard will announce this week a new line of Vectras, including 20- and 16-MHz, 80386-based floor-standing machines and a 286-based desktop PC. [See story, Page 5.](#)

Word Perfect 5.0 to Get Graphics Capabilities

By Scott Mace

WASHINGTON — Resizable graphics, Postscript support, and a format header to allow better networking of files are some of the new features in Word Perfect 5.0, said Alan Ashton, Word Perfect Corp.

president.

The new version for the IBM PC and compatibles, which has been in development for two years, will be officially announced at Comdex and shipped in the first quarter of 1988, said Ashton to a group of federal microcomputer users.

"You will see the ability in 5.0 to take graphics in, size them, and see them printed with text flowing around graphics," Ashton told the group. He later added that while 5.0 won't offer true WYSIWYG, subsequent releases will likely display and manipulate WYSIWYG text and graphics. A preview mode will provide a view of graphics before printing, Ashton said.

Word Perfect 5.0 will contain other desktop publishing features found in programs such as Aldus Pagemaker and Ventura Publisher, Ashton said. For example, users will no longer be limited to six or eight lines per

[Continued on Page 117](#)



IBM's Chet Heath explained the Micro Channel's features.

• TECHNOLOGY CLOSE-UP

IBM Designer Sheds Light on Micro Channel Architecture

By Michael J. Miller and Alice LaPlante

In an exclusive interview, Chet Heath, the chief designer of IBM's Micro Channel Architecture gave InfoWorld a close look at the new bus design, detailing what it means for PC users. Heath was interviewed by InfoWorld following a technical seminar he gave on the MCA at PC Expo.

IBM's Micro Channel Architecture is a versatile and complex design whose capabilities will become clear only through a long-term education process, according to Heath.

"The complexity of the Micro Channel is such that it makes educating the industry a difficult job," said Heath, who has been traveling around the world over the past months.

[Continued on Page 32](#)

Microsoft Windows 386 To Beat 2.0 Out the Door

By Peggy Watt

REDMOND, WA — A true multitasking Microsoft Windows that will run strictly on 80386-based systems and accommodate virtually all DOS applications will be unveiled Wednesday, according to those who have seen the product.

A handful of Windows applications developers will also announce and show products at the announcement. Most of the new applications, however, are written for Windows 2.0 and PC-, XT-, and AT-compatible systems. Windows 2.0 is expected to be announced next month with Microsoft's power spreadsheet Excel for the PC, said sources involved in this week's

announcement.

Sources familiar with the product say the newest release of Windows works with DOS as a single unit, though it is up to OEMs to bundle it with the operating system. Both Compaq and Unisys are said to be planning to include Windows 386 with 80386-based systems, which prompted this week's announcement, even before the release of Windows 2.0.

Windows 386 will actually resemble Windows 2.0 and the OS/2 Presentation Manager in its user interface, using overlapping windows instead of the tiled windows of the current

[Continued on Page 117](#)

Turbo Programs to Link Paradox Applications

By Rachel Parker

In an announcement designed to reinforce its commitment to the high-end corporate market, Borland last week said its Ansa subsidiary is developing five versions of Paradox.

Borland's goal is to make it possible for corporate programmers to use Turbo language programs to write Paradox applications that run under current DOS, DOS-based 80386 systems, OS/2, Windows, Presentation Manager, and

Unix. Ansa plans to provide Paradox for all these environments while maintaining 100 percent file compatibility, a consistent user interface, and SQL support.

"We want to leverage the additional power of these different operating environments while hiding the complexity from the user," said Richard Schwartz, vice president of software engineering at

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See First
Look on
Quattro
Page 5.

AT DEADLINE

Compaq Readies 80386 Portable III

In its drive to prove that high-performance computing does not require a Micro Channel bus, Compaq is expected to introduce a 20-MHz version of its Deskpro 386 and an 80386-based version of its Portable II next week, according to sources close to the company.

Along with a 20-MHz version of Intel's 80386 chip, the new Deskpro will include disk caching and improved memory management techniques to further boost the speed of the machine. To

maintain its leadership position in the portable market, Compaq will announce the 80386-based Portable III, sources said. Sources also said they believe Compaq will offer Microsoft's upcoming Windows 386 with the machines.

Prices of the new systems were not known, but sources report that the current Deskpro 386 and Portable II models will not be dropped in price when the new machines are announced.

— Rachel Parker
[Continued on Page 3](#)

Borland's new Turbo C proves that high-end compilers don't have to be high-priced compilers

Fast programs instead of fast bucks are the rule at Borland. Which is why Turbo C[®] is so much faster than Microsoft[®] C and only \$99.95 instead of their \$450.00. We're technically ahead of them—look at the Benchmark numbers—but way behind them on price. Which is not a bad place to be. For you. For us. Maybe not for them.

Sieve Benchmark

	Turbo C	Microsoft C
Compile time	2.6	22.41
Compile and link time	5.9	24.49
Execution time	6.59	10.11
Object code size	239	249
Execution size	\$748	7136
Price	\$99.95	\$450.00

Benchmark run on a 68010 IBM AT using Turbo C version 1.0 and the Turbo Linker version 1.0. Microsoft C version 4.0 and the MS overlay linker version 3.51.

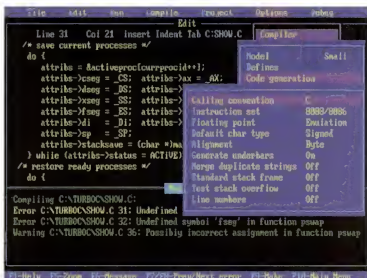
Turbo C is "high-end" without being high price

Turbo C has all the features found in the high-end Microsoft C compiler—except the high price. Turbo C compiles faster, links faster, makes smaller. EXE files, and has a quicker edit/compile turnaround than Microsoft C.

Turbo C is an absolutely professional compiler at what looks like an amateur price. But low cost has never meant low quality at Borland—rely on Turbo C and enjoy working with a program that's about 5 times faster than Microsoft C, and keep that \$350.05 difference in your hands and not theirs.

Yes, we have. No, they don't.

	Turbo C	Microsoft C
Runtime library source code	Yes	No
BIOS support	Yes	No
Inline assembler	Yes	No
Automatic register variables	Yes	No
Register pseudo-variables	Yes	No
Sample spreadsheet source code	Yes	No
Interrupt function	Yes	No
Integrated Editor	Yes	No
Integrated Make	Yes	No
Integrated Linker	Yes	No
Price under \$100	Yes	No



Window 1: Edit window C source pseudo-variable (X) to get to CPU registers

Window 2: Message window Shows warning for use of equals in white test 'LINT' syntax checking

Window 3: Code generation menu

Technical Specifications

- ✓ **Compiler:** One-pass optimizing compiler generating relocatable object modules. Includes Borland's high-performance Turbo Linker. The object module is compatible with the PC-DOS linker. Supports tiny, small, compact, medium, large, and huge memory model libraries. Can mix models with near and far pointers. Includes floating point emulator (utilizes 8087/80287 if installed).
- ✓ **Links** with relocatable object modules created using Borland's Turbo Prolog into a single program.
- ✓ **Interactive Editor:** The system includes a powerful, interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code.
- ✓ **Development Environment:** A powerful "Make" is included so that managing Turbo C program development is highly efficient. Also includes pull-down menus and windows.
- ✓ **Inline assembly code.**
- ✓ **Loop optimizations.**
- ✓ **Register variables.**
- ✓ **ANSI C compatible.**
- ✓ **Start-up routine source code included.**
- ✓ **Both command line and integrated environment versions included.**
- ✓ **License to the source code for Runtime Library available.**

"Turbo C does look like What We've All Been Waiting For: a full-featured compiler that produces excellent code in an unbelievable hurry... moves into a class all its own among full-featured C compilers... Turbo C is indeed for the serious developer... One heck of a buy—at any price."

Michael Abrash, Programmer's Journal



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Turbo C isn't just quick, it's super-fast

We're talking compilation speeds of better than 13,000⁺ lines a minute—which makes everyone else's pace look slower than molasses in January.

Super-speed from Borland is no surprise because we invented fast compilers with our first success, Turbo Pascal. You've made Turbo Pascal a worldwide standard, and we've kept the action moving with Turbo Prolog[®] and Turbo Basic[®].

Turbo C is a complete, interactive programming environment including a FREE MicroCalc[®] spreadsheet with source code, and like Turbo Pascal and Turbo Prolog, it comes with an interactive editor that will show you syntax errors right in your source code. Developing, debugging and running Turbo C's programs is amazingly easy and incredibly fast.

Get your copy of Turbo C today

You need Turbo C. Go for the speed and technical superiority.

And if you've got friends who will pay \$450.00 for a program that's nowhere near as good as our \$99.95 Turbo C—they're probably in the market for the Brooklyn Bridge! (We know you're not!)



*Run on an IBM PS/2 Model 60 using Turbo C version 1.0 and the Turbo Linker version 1.0.

Minimum system requirements: IBM PC, XT, AT, PS/2 and true computers PC-DOS 4MS-DOS 2.0 or later, 286K.

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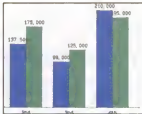
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Autodesk Ships New Version of Autocad

Autodesk Inc. of Sausalito, California, began shipping last week an update of its Autocad software that includes an enhanced user interface and increased file portability in network environments.

The new interface features pull-down menus, icon menus, and dialogue boxes, and users can program the menus to customize their working environment, the company said. In addition, files created by Autocad can now be accessed by supported computers in a network running DOS, Apollo's AEGIS, DEC's VMS, or Sun Microsystems's Unix.

Other new features include improved curve generation using B-splines, 20 text fonts, several enhancements to Auto-Lisp, and a drawing slide utility that arranges Autocad drawing slides in libraries as an aid to creating icon menus. The program is \$2,850.

— Eric Lach

Paradise Introduces Video Display Cards

Paradise Systems Inc. of Brisbane, California, unveiled last week two video display cards based on its PVGA1 video controller chip that will provide VGA, CGA, MDA, and Hercules monochrome graphics modes for IBM PC XT's, AT's, and compatibles. Scheduled to ship in November, the cards also provide BIOS compatibility with MCGA and EGA for the AT bus.

The Paradise VGA Plus Card, which will retail for \$399, is a replacement board designed for users wanting to add VGA capabilities to their existing systems, or speed and Hercules graphics to their PS/2 Models 25 or 30.

The \$399 Paradise VGA Professional Card provides enhanced graphics capabilities for users of standard text and advanced graphics applications. The card displays up to 1,024-by-768 resolution in monochrome and 256 colors in VGA resolution.

— Renee Mathews

COS Software Tests Transport Protocols

Software that tests transport protocols in the open systems interconnection (OSI) model, intended to allow computers with proprietary hardware and software to communicate more easily, has been released for the first time by the Corporation for Open Systems (COS) of McLean, Virginia.

More than 300 test cases are included to aid vendors developing transport protocols, which may be given a COS license of conformance as soon as next summer. By the end of 1987, COS will also release test products for other OSI components or options, including the IEEE 802.4 Token Bus, Internet protocols, file transfer and access management (FTAM), and message-handling systems (MHS) protocols.

One COS member, 3Com Corp., is beginning to move from its own protocols to OSI protocols. "The timing of these announcements is good, relative to our developments," said Robert M. Metcalfe, 3Com chairman.

— Scott Mace

Javelin Appoints New Underwriter for IPO

Javelin Software Corp. of Cambridge, Massachusetts, announced it has appointed a new underwriter to manage the initial public offering of 1.5 million shares of its stock priced at \$5 per share.

Originally, the company had planned to generate about \$5.7 million by offering 815,000 shares of stock at between \$6 and \$8 each, according to a preliminary prospectus dated July 1. The revised offering is expected to generate \$7.5 million, Javelin said.

The new underwriter, North American Investment Corp. of East Hartford, Connecticut, replaces the underwriter James J. Dunn & Co. Inc. of New York. The offering is being registered by the Securities and Exchange Commission and could become available in mid- to late-October, according to Ronald Jordan, senior vice president of investment banking for North American Investment.

— Edward Warner

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—New York Times. ■ "Highly recommended for business users."
—Time-Life Access Newsletter.
■ "Indispensable."—PC Magazine. ■ "Essential in day-to-day personal computing."—Personal Computing Magazine. ■ Three years voted "World Class" Best Utilities.
—PC World. ■ "A pleasure to use."—PC Week.
■ "You'll bless this disk."
—Peter McWilliams/
The Personal Computer Book.

A life saver for your data.



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Which of the new Norton Utilities is best for you is up to you, of course.

But one thing's for sure.

Either way, you'll get the best of Peter Norton.

Peter Norton
COMPUTING

HP to Replace Current Line Of Vectra PCs

By Eric Lach

In a move that greatly expands its product line, Hewlett-Packard Co. this week will replace its current Vectra PC microcomputers with five new machines, including two models based on the Intel 80386 chip.

"These announcements give them a full set of fighting machines," said Norm DeWitt, director of Dataquest's personal computer industry service. While the new products should help stop the erosion of Hewlett-Packard's user base to product lines such as IBM's PS/2, it's unclear whether the new Vectras can find the space on dealers' shelves to win new customers.

HP will unveil the Vectra RS/16, a 16-MHz 80386-based floor-standing machine; the Vectra RS/20, a 20-MHz version of the RS/16; the Vectra ES PC, an 8-MHz 80286-based desktop machine that is an enhanced version of the current Vectra PC; the Vectra ES/12, a 12-MHz version of the Vectra ES PC; and the Vectra CS PC, the line's entry-level machine based on the NEC V30, an Intel 8086-compatible processor.

All models, except for the RS/16 and RS/20 machines, will be available in October or November, said Jim Carlson, marketing manager for HP's

The New HP Vectras			
Model	Features	Available	Price
C5 Models			
Model 10	640K floppy disk drive	Nov. 1	\$1,195
Model 20	640K floppy disk drive, 20MB hard disk	Nov. 1	\$1,895
E5 Models			
Model 10	1.2MB floppy disk drive	Oct. 1	\$2,595
Model 20	1.2MB floppy disk drive, 20MB hard disk	Oct. 1	\$2,795
ES/12 Models			
Model 10	1.2MB floppy disk drive	Oct. 1	\$2,995
Model 20	1.2MB floppy disk drive, 20MB hard disk	Oct. 1	\$3,195
Model 40	1.2MB floppy disk drive, 40MB hard disk	Oct. 1	\$4,195
ES/16 Models			
Model 40	1MB RAM, 1.2MB floppy disk drive, 40MB hard disk	Q1 88	\$6,495
RS/20 Models			
Model 40	1MB RAM, 1.2MB floppy disk drive, 40MB hard disk	Q1 88	\$7,495
Model 100	2MB RAM, 1.2MB floppy disk drive, 103MB hard disk	Q1 88	\$8,995
Model 150	2MB RAM, 1.2MB floppy disk drive, 153MB hard disk	Q1 88	\$9,995
Model 300	2MB RAM, 1.2MB floppy disk drive, 310MB hard disk	Q1 88	\$11,995
Vectra Publisher PC			
Vectra ES	20MB hard disk drive, monochrome display	Oct. 1	\$4,389
Vectra ES/12	20MB hard disk drive, EGA	Oct. 1	\$5,499
Vectra ES/12	40MB hard disk drive, EGA	Oct. 1	\$6,499

personal computer business unit. The 386 machines are scheduled for delivery in the first quarter of 1988.

HP also will introduce hardware and software accessories for the new systems, including expanded memory boards, 3½-inch internal floppy disk drives, disk drive controllers, and high-capacity hard disk drives.

To allow the new machines to work with HP's higher-end systems, each model comes with terminal emulation software as standard, Carlson said.

In addition, disk-cache soft-

ware is included with each system for enhanced performance, Carlson added.

Besides the basic models, HP also will offer both models of the Vectra ES PC in Vectra Publisher PC packages for desktop publishing. The Vectra ES/12 and CS PCs will be available in Vectra Starline PC packages for use as nodes with the HP 3000 minicomputer or in local area networks.

Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, CA 94303; (800) 367-4772.

VP-Planner Plus Adds New "Look and Feel"

By Edward Warner

Changing its "look and feel," the latest version of Paperback Software International Ltd.'s VP-Planner spreadsheet, to be unveiled Tuesday, features pull-down menus and other functions not found in spreadsheet best-seller Lotus 1-2-3.

Company spokeswoman Janet Walden declined to discuss whether the changes were made in response to Lotus' pending lawsuit that claims VP-Planner infringed the copyright on 1-2-3's "look and feel," or user interface and command structure. Company president Adam Osborne acknowledged, "We obviously considered it" in updating the package.

Other VP-Planner Plus features are a text editor for word processing within a spreadsheet and new report generation functions that let users import text or graphs into a spreadsheet, Walden said. Also new are the capability to automatically save a file at user-set intervals and a toolbox to draw boxes and lines. Setup and maintenance of the product's multidimensional database are now easier, she added.

Also, on the heels of Lotus' announcement that it will drop copy protection on the next release of 1-2-3 (see story, page 1), Paperback Software will remove copy protection from its entire line but boost all prices

approximately 25 percent.

Walden noted that users of the enhanced version of VP-Planner may adopt the original program's interface if they choose.

"Some of the features [of VP-Planner Plus] allow you to manipulate the appearance of the screen," Walden said.

VP-Planner Plus does not replace the original VP-Planner, but offers full compatibility with 1-2-3. Release 2, while VP-Planner will still be sold as a compatible alternative to 1-2-3, Release 1A, Osborne said. VP-Planner will be updated to Release 1.37, VP-Info to Release 1.4, and VP-Expert to Release 1.2 this week.

VP-Planner Plus will cost \$179.95, while VP-Planner and the rest of the VP-series — VP-Info, VP-Expert, and VP-Graphics — will increase from \$99.95 to \$124.95. Current VP-Planner users may upgrade for \$50.

Walden said the company did not drop copy protection because of Lotus, but because the company's attorneys decided "shrink-wrap licensing" provides adequate copyright protection.

Paperback Software Ltd., 2830 Ninth St., Berkeley, CA 94710; (415) 644-2116.

— Peggy Wai also contributed to this story.

Quattro Spreadsheet Goes After 1-2-3 Market With Speed and Ease of Use

By Michael J. Miller

With Quattro, Borland International becomes the latest in a recent series of vendors challenging Lotus Development's 1-2-3 dominance in the spreadsheet market. Borland's approach has been to hit 1-2-3 on Lotus' own turf: speed and ease of use.

Like 1-2-3, the Quattro worksheet is 256 columns by 8,192 rows; it can read and write 1-2-3 worksheets, graphs, and macros. Its most unusual feature is a replaceable user

interface, initially coming with one of its own and one mimicking 1-2-3. You can also customize the interface to include your choices for wording, commands, macros, and add-ins.

In either interface, the menu pops up when you type the slash key, and the program displays an explanation line at the top of the screen. In the 1-2-3 user interface the commands are listed in the same order as in 1-2-3, with Quattro's unique features specially indicated. Borland believes the difference in look, combined with the user's choice of wording, lets it

avoid the "look and feel" issue.

Perhaps the most visible functional improvement is in the graphics, where Quattro allows you much greater control over the way your charts appear. In addition to the standard charts,

Quattro adds area, horizontal, and 3-D bar charts.

Quattro lets you mix two different graph types on the same graph. It lets you change the patterns, markers, and colors used in the graph itself and gives you on-screen control over the size and fonts used for titles on the graphs. Finally, you can print graphs from within the spreadsheet, rather than requiring a separate graph printing utility, though it also lets you create and use Lotus PIC files. Quattro is also exceptionally fast at displaying graphs.

Quattro includes macro recording to capture commands and keystrokes to a set of cells in the worksheet. Up to 27 of those macros can be accessed with Alt-key sequences, with others called from a Macro menu.

Quattro is one of the most customizable products I've seen. It automatically senses the type of video adapter used and lets you define the colors and patterns you want for your spreadsheet. You can even set up colors that change based on the contents of the cell, such as

green for numbers over 100 and red for negative numbers, so the "red ink" really is.

Unlike 1-2-3, Quattro does not require a separate installation program. You can install and change printers, change the monitor's resolution, and change the format for dates and numbers from within the program. The spreadsheet includes a search-and-replace capability. And the add-in manager was designed to make it easier to create add-ons.

One crucial feature we cannot accurately judge in pre-release is speed. Borland claims

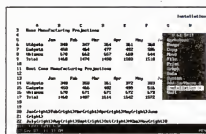
a feature called "minimal recalculation," in which Quattro only recalculates those cells affected by a change, will make the program faster in everyday use.

All told, Quattro has features that 1-2-3 users will want

— better graphics, easier macros, no copy protection — plus compatibility with the files and keystrokes they already use.

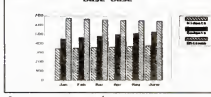
It still isn't everything you could want in a spreadsheet. It lacks some of the advanced features of Microsoft Excel, such as easy linking of spreadsheets, opening multiple graphs and multiple spreadsheets simultaneously, and mouse support. At \$199.95, however, Quattro is much less expensive than 1-2-3 and probably the PC version of Excel as well. At that price, many 1-2-3 users may find Quattro as a logical next step.

First Look



One of Quattro's pop-up menus lists commands in Lotus 1-2-3 order — or you can customize it.

Manufacturing Projections



Quattro gives you for greater control over graphics, including on-screen control over the size and fonts used for titles on the graphs.

Some 386 Systems Won't Run 32-Bit Software, Intel Says

By Tom Moran

Owners and prospective buyers of 386 machines should check carefully under the hood if they want to run 32-bit software.

Some systems integrators aren't telling users that their computers contain 386 chips that failed Intel's 32-bit software tests, said Intel and other sources.

Richard Ullman, a consultant in New York, had advised a customer to save \$40,000 by using Unix System V/386 and a 386 machine instead of a minicomputer. Then another client reported that

the operating system was repeatedly crashing on a 386-based system. An embarrassed Ullman felt compelled to call his first client back and reverse his recommendation. "I said, 'Well, don't go with the 386 because I don't know if it will work.'"

It turned out that the crashed system's microprocessor was labeled "For 16-bit software only." The computer's owner had not been informed of its limitations by the vendor, whom he declined to name publicly. But the problem is not

limited to one vendor, according to an Intel representative who confirmed that the crashes were due to the widely reported 32-bit multiply problem on early versions of the chip. "Some people are selling the boards to are selling them to others and not informing their customers," he said. "We are trying to sell through legitimate people who are supporting their customers correctly. Appropriate action is being taken and will continue to be taken when resellers fail to do so."

Buyers of 386 machines should check the microprocessor to see if it has been certified for 32-bit software. A double Sigma on the chip indicates that it has been tested and is fully 32-bit, according to an Intel spokeswoman. A "16-bit s/w only" label indicates that the chip failed the 32-bit test but passed the 16-bit test.

No marking on the chip indicates that it has not been tested for the 32-bit multiply problem.

Present owners who find that their chips failed the 32-bit test should contact their supplier, said Intel. The company said it would replace those chips on a vendor's request in the first half of 1988.

As of July, Intel has only been shipping chips that can run 32-bit software, the spokeswoman said. The only source of chips limited to 16-bit software is resellers who are still bringing back old chips to be tested, she noted. Those resellers can choose to get back their own chips that fail the 32-bit test and have them replaced with the 32-bit version later.

Adobe Cautions Developers Not To Use Trademark

By Eric Lach

MOUNTAIN VIEW, CA — Adobe Systems Inc. warned last week it will take legal action against anyone who uses the name "Postscript" without permission to describe an interpreter of the Postscript page description language.

"We want it to be clear in the end-user's mind that what they are getting is Postscript by Adobe's definition and with Adobe's technology," said Liz Bond, director of marketing communications for Adobe.

The name Postscript is trademarked and applies to the language and the manuals that describe the language, according to Bond. "We will never license the trademarked name Postscript to anyone else for a software product," she said.

Developers who write programs in the Postscript language and drivers that output in Postscript "won't be pursued legally," Bond said. "We very aggressively evangelize for that and want people to do it," Bond said. "It is our intention to continue to offer them a royalty-free unwritten license to use that copyrighted material."

However, Adobe is carefully watching those developers who are working on Postscript-compatible interpreters and drivers that take action if a developer describes a product in a way that Adobe thinks infringes its trademark on the Postscript name, Bond said. "If we allowed them to do that, there would be a great deal of confusion in the marketplace."

To avoid being sued, developers may get written permission from Adobe to use the trademark, Bond said, adding that Sun Microsystems Inc., also of Mountain View, has such an agreement.

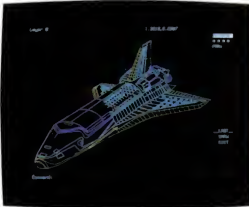
"[Adobe] may have a legitimate claim to some extent," said Dan Siegel, an attorney with the Santa Clara, California, firm of Skjerve, Morrill, MacPherson, Franklin & Friel, who specializes in copyright issues.

Most trademark cases, however, hinge on how the trademarked term is specifically used, Siegel said. "I can see them prevailing in a case where someone says this is a Postscript interpreter," he said. "But I think they will have a tough time with someone who says here is my XYZ interpreter, which will interpret programs written in the Postscript language developed by Adobe. I don't think they will be able to stop the use of the Postscript name completely."

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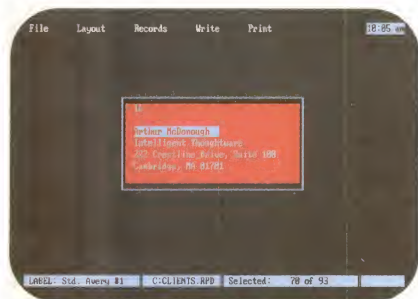
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*Lotus software drivers may not be available at time of initial shipment, but will be provided at no charge at a later date.

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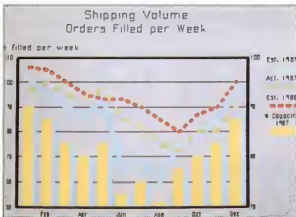
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Lotus' Graphwriter II can import 1-2-3 files and other data into a variety of formats. It is especially well-suited for financial analysis.

Graphwriter Update Adds Lotuslike Interface

By Edward Warner

As the first enhancement since acquiring the product more than a year ago, Lotus last week upgraded Graphwriter by adding a Lotuslike interface and the capability to import data in a range of formats, including 1-2-3 files.

Lotus said the enhancement was significant enough to warrant a new name — Graphwriter II — and a repositioning of the product for use by financial analysts and others who generate charts in quantity. The \$495 product, which ships in October, "is basically a whole new product," said Tim Davenport, director of the Lotus graphics products group.

Davenport said Graphwriter II is designed for volume chart production and can update and generate as many as 100 charts at one command. The old version, acquired in the June 1986 purchase of Graphic Communications Inc., only accepted direct import of DIF and SYLK files, but Graphwriter II accepts Lotus WK1, WRK, WRI, and WK1 files, as well as ASCII files and those created by Lotus' Freelance Plus or Ashton-Tate's Dbase III, according to Lotus. The update also increased from nine to 24 the number of available chart types and allows users to place multiple charts on a page, add three-dimensional effects and change colors, and fill patterns and text sizes, the company said. Borrowing a concept from word processing, Graphwriter II supports "style sheets" in which the style of a chart can be predetermined for repeated generation using new data, Lotus said.

Graphwriter II is especially useful for batch chart production, said Miki Zlatianin, information center consultant at Chicago-based FMC Corp., who used a beta version for a month-and-a-half. She said she once produced 25 Graphwriter II charts on a Hewlett-Packard Co. plotter in about two hours, much less time

than the earlier version would have required, she said.

Graphwriter II requires a PC XT or AT with 512K of RAM and a graphics adapter. Graphwriter will eventually be discontinued, and users who bought it after July 15 will receive the upgrade free. Those who bought before that date may upgrade for \$75.

Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 225-1841.

Novell Teams With Developer To Integrate Macs on Its Nets

By Laurie Flynn

PROVO, UT — Novell Inc. is working with a third-party developer to ready software for integrating Macintoshes into Novell networks, taking the first step in the company's strategy to support multiple operating platforms.

Although Novell officials would not identify the developer, a number of sources familiar with the project said that Novell is working on the software with Dayna Communications, the Salt Lake City-based maker of the Mac Charlie coprocessor and the more recent Dayna File. The new network program will be available in March 1988, the sources said.

Support for Macintoshes on a Novell network will be included with Network 2.2, which will be available at that time, sources said. Dayna will also offer its own version of the file server software for use on purely Macintosh networks. That program, which will require a PC AT server, will be positioned as an alternative to such programs as AppleShare and Centram's Tops, sources said.

Novell spokeswoman Cheryl Snapp declined to provide

IBM Broadens Courier Repair Service

By Alice LaPlante

IBM just made its PC and PS/2 maintenance services a little cheaper and a little more convenient.

On-site workstation maintenance services — called Customer On-Site Exchange and Customer On-Site Repair contracts by IBM — have been so popular that IBM is expanding the programs as well as cutting the costs to corporate users of those services.

"Under our on-site contracts, an IBM courier goes to the customer site, picks up the faulty equipment, takes it away, and — depending on whether a customer has an exchange or repair contract — brings back either a new or a repaired element," said Dale Bennett, an IBM spokesman.

Previously, IBM also offered maintenance contracts where the customers themselves brought the faulty equipment to an IBM Service/Exchange center.

However, because IBM expects the new courier service to be so popular, it is closing its 120 Service/Exchange Centers — scattered nationwide — on October 1.

Customers will still be able to take malfunctioning workstation equipment to IBM authorized dealers or other designated IBM locations, said Bennett.

Bennett said that the courier

pick-up and delivery service will cost the same price or less than what customers are paying now for carry-in service.

In addition, the new courier service is available at a lower price than IBM's former courier service offering.

IBM has also set a four-hour response goal for on-site repair calls.

IBM's workstation maintenance agreements apply to 163 "elements" — systems, peripherals, or components — involving PCs or PS/2s.

The new courier service is available only when the customer signs a maintenance agreement — not when customers pay for each service call, said Bennett.

AMD Introduces Chip Set for Use In 100-Mbps Fiber-Optic LANs

By Mark Stephens

A technology advance that soon may result in 100-Mbps fiber-optic local area networks comes this week from Advanced Micro Devices Inc. (AMD) with its introduction of the first chip set implementing the Superfast Fiber Distributed Data Interface (FDDI) LAN standard.

The FDDI standard, which has yet to be approved by the American National Standards Institute (ANSI) or the International Standards Organization (ISO), defines a network composed of two rings of optical fiber up to 100 kilometers long, interconnecting up to 500 nodes. The rings consist of a series of point-to-point connections that repeat data as they go around the ring. The primary ring is used for data transmission, with the secondary ring used mainly for backup in the event of a link or station failure, though gutsy LAN designers could use the second ring to increase data transmission to 200 Mbps.

Previously, AMD said, the implementation of an FDDI network adapter has taken much time and cost in excess of \$50,000 per station, AMD's Supernet five-chip set is available now in samples and will be in full production in January at a list price of \$625 per set, which suggests adapter card products as soon as the second quarter in the \$5,000 price range or below.

"We mainly see FDDI being implemented as a fiber-optic backbone with Ethernet or token rings connected to it," said Tom Slykhouse, AMD's strategic marketing manager for high-speed LANs. "That much bandwidth, of course, is very attractive for engineering workstations or distributed processing, and I am sure we will see applications at that level as soon as the price of the technology begins to drop. Eventually, I am sure FDDI will make it all the way down to PCs."

Advanced Micro Devices, 901 Thompson Place, Sunnyvale, CA 94088; (408) 732-2400.

Tape Backup to Offer High Compression, Speed

By Mark Brownstein

A new hard disk and tape backup system with high compression and a speed boost is in the final stages of development by Fifth Generation Systems Inc., sources close to the company said.

The product is expected to be announced in October as Fastback Plus. The third-generation hard disk backup program will contain "the best features of all backup programs," according to sources outside the company who have seen the product.

Fastback Plus will be com-

pletely new, rather than an upgrade of the current program. A new compression algorithm will significantly reduce the number of floppy disks required to back up a hard drive.

The program will come with three different user interfaces: beginner, intermediate, and advanced. The advanced interface will allow backup to all floppy media, including 360K and 1.2-megabyte disks, and 720K and 1.44-megabyte 3 1/2-inch media, and will also allow backup to streaming tape devices.

Set for introduction on October 1, the product will be released in time for fall Comdex. Company officials declined to discuss the product, although they confirmed that Fifth Generation officials released details about the product to a group of dealers at a New York conference. No details of pricing on the new version were available.

Fifth Generation Systems, 2691 Richter Ave., Suite 107, Irvine, CA 92714; (714) 553-0111, (800) 225-2775.

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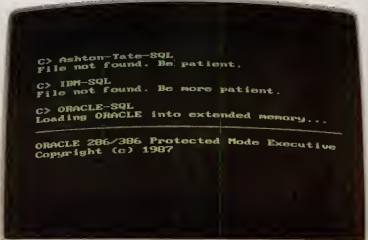
- Ashton-Tate has announced its intention to replace its outdated database technology with a SQL DBMS under OS/2, and
- IBM has announced its intention to offer SQL for OS/2 in its Extended Edition.

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News Briefs

FCC Lengthens Access Charge Comment Period

The FCC has extended the comment period for its proposed access charges that could raise on-line provider rates as much as \$5 an hour. Originally, the last date for public comment was to have been September 14. In August the FCC extended the comment period until September 24, and replies can be submitted until October 26.

The extension was requested by a consortium of 23 companies and organizations headed by Adapso, the computer software and services trade group. The group said it needed more time to prepare its responses to the FCC access charge proposals. In the meantime, public comment on the matter (Docket No. 87-215) has been running overwhelmingly against the proposal, with many letters from on-line service users at major universities protesting the financial hardship the new access charges would inflict on them.

Firm Lowers Price of Voice Messaging System

Natural Microsystems Corp. has cut the retail price of the Watson voice messaging product from \$495 to \$199 and has begun marketing the product directly to users via a toll-free number.

The company is also cutting the price of its high-end VIS Combo product from \$796 to \$399. VIS Combo adds an application generator for building voice-mail systems and handles complex incoming and outgoing voice-message schemes.

Natural Microsystems, 8 Erie Drive, Natick, MA 01760; (800) 533-6120.

Turbo Package Permits Multitasking on LANs

Turbo Pascal programmers can create multitasking and multiprocessing programs to run on LANs with Conversational Computer Systems' Turbo Package 3.0.

The \$149 package includes a toolbox, utilities, and a precompiler. It allows an applications programmer to control which processing function will reside on specific processors, allowing for improved network performance and traffic control.

Conversational Computer Systems, 5371 Verbena Road, San Antonio, TX 78240; (512) 692-0353.

Judge to Ease Information Services Restrictions

Decision Allows BOCs to Provide Gateways But Not Content

By Scott Moore

The federal judge who presided over the breakup of the Bell System has decided to relax some restrictions barring the Regional Bell Operating Companies (BOCs) from providing information services.

In a 223-page decision, U.S. District Judge Harold H. Greene from the District of Columbia said he is prepared to let BOCs provide gateways to information services, including X.25 protocol conversion, but BOCs would not be allowed to provide content for those services.

Greene ordered interested parties to submit proposals by September 30. After a short reply period, Greene said he will issue an order modifying the present restrictions.

Judge Greene's action disappointed Regional Bell Operating Companies, which, with the U.S. Justice Department, had

advocated lifting all restrictions on BOCs providing information services. "Today's decision places the benefits of modern telecommunications services just beyond the reach of most telephone customers," read a statement from Arthur C. Lano, executive vice president of Pacific Telesis Group, a San Francisco-based BOC. "We sincerely hope that today's ruling will be short-lived and that potentially damaging consequences to our telecommunications infrastructure don't result."

Analysts believe the BOCs will turn to Congress to speed up further deregulation of the local phone companies. "You can tell from the reactions of the BOCs that they're most irked about Greene's denial of motions on manufacturing and long-distance restrictions," said Gary Arlen, editor of *Interactivity*

Report, in Bethesda, Maryland.

"But when the BOCs go up to Capitol Hill in the next month or two, information services will be the first item in their portfolio," Arlen said. "It may be a nice, flag-waving piece of rhetoric, but I don't know that they're all going to jump into that business."

Greene contended that a bottleneck on local access continues, and meaningful, large-scale alternatives do not yet exist for information service providers.

The Information Industry Association (IIA), which represents information providers such as Compuserve, applauded Greene's decision.

"By permitting the BOCs to provide gateway services, the Judge's decision is expected to further the development of new information services," said Paul Zurkowski, president of the IIA.

LAN Wares to Use Encryption, TCP/IP

By Mark Stephens

For those who have secrets and want to keep them, Bridge Communications Inc. is shipping what it claims to be the first two local area network products to support both data encryption and the TCP/IP protocol set.

According to Bridge, its Secure CS/50 is a communications server that can support up to two devices such as asynchronous terminals, printers, modems, host ports, or PCs, offering up to eight simultaneous sessions per device at up to 19.2 kbps. The Secure NCS/AT is an AT-compatible, Xenix-based network management station for centralized control and monitoring of the network, storing up to 2,048 logical names and port-level

configuration information for attached servers. For an encrypted LAN to function, it must have a combination of the two products, with Secure CS/50s for each pair of workstations or output devices and a Secure NCS/AT to manage the LAN.

Tom Russell, product manager for Bridge's Government Products Division, said that LANs built with these products, while not meeting Tempest specifications, can operate either as encrypted or non-encrypted services, allowing connectivity with other nonsecure networks or computers. The products provide user authentication, security profiles, access controls, data encryption, and audit trail information for controlling,

monitoring, and analyzing proprietary data.

"Encryption takes place on two levels," said Russell. "There is a public key encryption scheme for user authentication and then DES encryption of the actual network session. This combination of public keys and DES encryption makes the system both faster and more secure."

"These products are not intended to meet Tempest requirements as established by the Department of Defense," said Russell. "We will be introducing products for that market in the future. Right now we are aiming more at financial institutions and other companies, and government agencies who have proprietary information to protect."

Russell said there are three levels of access control: controlling when and via which ports a user can access the network, defining each user's access level and user group partitions, and prescribing whether a user is given access to a particular resource. The Secure NCS/AT security audit trail records log-in and access control violations and key management activity.

The list price for the Secure CS/50 is \$2,195, with the Secure NCS/AT priced at \$1,790. For those who already have an AT kicking around, the NCS/AT upgrade kit is available for \$6,250.

Bridge Communications Inc., 2081 Stierlin Road, Mountain View, CA 94043; (415) 969-4400.

In the opinion, Greene noted that the United States lags behind other countries, particularly France, in providing information services to consumers.

"The French information services scheme permits individual citizens to secure an enormous number and variety of information services with ease and at a reasonable cost," Greene stated.

Compuserve Users Receive Crosstalk Forum

By Robert Snowdon Jones

DCA/Crosstalk Communications Inc. said last week it has started a forum on Compuserve that provides on-line upgrades to its communications software to help encourage the development of scripts for Crosstalk Mk. 4 and provide better support.

The forum contains data libraries and a message board for all Crosstalk (formerly Microstuf Inc.) products.

The company has had an internal bulletin board for support, but it was difficult to access. "We've had a support [bulletin board system] at Crosstalk for years, but only one person could get into it at a time," said Sheldon T. Hall, Crosstalk's special projects manager and head system operator for the forum.

The new forum hasn't been announced, but it's already been busy, said Hall. Most of its users have read about it on other Compuserve forums, he said. The forum's alternate system operator is Maria Forrest, who handles technical questions.

Hall said the modular design of Mk. 4 makes it extremely easy to supply frequent upgrades on-line. Several upgrades and utilities for Mk. 4 have been posted by Crosstalk, including a script to convert Crosstalk XNVI command files to Mk. 4. Another script complexes a set of files on a Compuserve forum, compares them with those already on the computer's disk, and automatically downloads new ones or ones the user chooses. Fat Man, a video game that can be played in Mk. 4's background, is also in the forum's data library.

Compuserve subscribers can access the forum directly by typing "Go Xtalk."

Crosstalk Communications Inc., 1000 Holcomb Woods Parkway, Roswell, GA 30071; (404) 998-3998.



Bridge Communications' Secure CS/50 (front) and Secure NCS/AT provide data security and access control for network users and resources in sensitive or controlled environments.

Battle for 10-Mbps Ethernet Twisted-Pair Market Intensifies

By Mark Stephens

With 10-Mbps Ethernet on unshielded twisted-pair wire already announced by 3Com Corp., Digital Equipment Corp., and Synoptics Communications Inc., the trend toward this cheaper, more flexible medium is certain. How these competing systems compare, however, is anything but clear.

In the wake of 3Com and DEC's announcement to jointly develop their similar versions of Ethernet over telephone wire, Synoptics Communications revealed this week that one of the beta test sites for its previously announced Lattisnet unshielded twisted-pair product is Novell Inc., publisher of Netware, the most popular local area network operating system. And Novell, it seems, likes Synoptics' product a lot.

In fact, according to Novell engineer J. Warren Harding, when Synoptics' Ethernet over telephone wire was compared in Novell's lab with Ethernet over RG-58U thin Ethernet cable, it performed as well or better than the more expensive coaxial cable, with nearly identical throughput and no measurable data loss.

Synoptics' Lattisnet on unshielded twisted-pair makes use of two pairs of

wires, while the 3Com/DEC implementation uses only a single pair, yet there are other, even more substantial differences between the products.

Among the 3Com/DEC beta testers is Stanford University where, so far, only the 3Com implementation has been installed. While there are differences between 3Com's Pairtamer product and the twisted-pair implementation of DEConnect that is on its way, they are based on essentially the same technology and, according to Stanford network head Bill Yundt, are very different from the product offered by Synoptics.

"What DEC and 3Com have done,"

Yundt said, "is extend the Ethernet environment out through the telephone wire, all the way to the switch plate. Synoptics, on the other hand, is extending a transceiver connection all the way from the wiring closet to the desktop. The major difference here, from our point of view, is that the Synoptics product only allows you to connect a single device. 3Com's product, by extending the Ethernet environment, allows you to connect thin Ethernet cable to the twisted-pair and thereby attach a number of workstations through a single outlet."

But even Stanford is not completely swayed by the low cost and flexibility of

Ethernet on telephone wire. "In many ways," said Yundt, "it makes our job here even harder. It offers tremendous flexibility and will allow us access to virtually every one of the 35,000 rooms on the Stanford campus, but it makes network management more complex. Now we have another distance parameter to worry about in our planning, and the system is more complex with these extra little boxes on the wall and in the phone closets. Those are all parts that can break. We'll use it where it makes sense, and gladly, but every time we remodel a building or build a new one, we will still install thin Ethernet cable."

Net/Scope Tool Lets PCs Analyze, Monitor Networks

By Mark Stephens

Ungermann-Bass Inc. is now shipping a sophisticated network monitoring and analysis product, called Net/Scope, that is claimed to greatly simplify troubleshooting local area networks that use XNS or TCP/IP protocols over Ethernet, Net/One broadband, or Net/One fiber-optic media.

According to UBI, Net/Scope, which includes both software and a special network interface board, allows an IBM PC or compatible to analyze network traffic and accurately forecast network growth.

Packet fields can be displayed or recorded, network statistics gathered using a range of predefined counters, and reports prepared to illustrate network characteristics, capacity, and response.

By allowing a manager to selectively view any network traffic, either workstation-to-workstation or segment-to-segment, UBI says that Net/Scope can quickly identify any source of network traffic problems.

In addition to custom counters, the product includes preprogrammed counters to measure all packets, broadcast packets, multicast packets, packets from other networks, packets to other networks, name-lookup packets, CRC errors, and alignment errors.

Net/Scope can operate unattended for long periods of time, allowing network managers to gather longitudinal data for network planning purposes.

The baseband version of Net/Scope is available for \$7,500, with the broadband model priced at \$8,150, including modem. These prices include a \$5,000 software license fee.

Ungermann-Bass Inc., 3900 Freedom Circle, Santa Clara, CA 95062; (408) 496-0111.



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Remote Input

By Bruce Miller

If Adopted, FCC Amendments Would Thwart Communications Development

Looming on the horizon is the specter of the Federal Communications Commission's "Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers."

If the amendments are adopted as proposed, local telephone companies will be allowed to charge enhanced service providers by the minute. The added costs will be passed on to the users of enhanced services.

While the FCC claims these amendments are part of a long-range policy

"toward an economically rational pricing scheme," their rationale to drop the exemption becomes specious when users of enhanced services are included in the picture.

Since the exemptions were first allowed in 1983, tremendous advantages have accrued to the population at large and the industry in particular. The boom in computer telecommunications by home users and small businesses is one significant change that is blazing a trail for data communications services.

Low-cost communications services, such as the innovative and popular PC Pursuit, begun in 1985 by GTE Telenet, are helping make new ideas in telecommunications applications possible. At night and during weekends, PC Pursuit allows users in 500 cities to make the long-distance link to computer message systems in 25 major metropolitan areas for a flat \$25 a month.

PC Pursuit and services like it have created an unprecedented platform for creative information exchange. Sudden-

ly, regional computer message systems became centers for the national exchange of ideas and information, leaping the geographical boundaries imposed by economic constraints. Specialized systems on genealogy and health have sprung up, and shareware producers make their programs easily available on computer bulletin board systems. Even the traditional software companies are setting up their own systems as a way to provide technical support.

But according to a recent statement by Telenet, if the proposal is adopted, "PC Pursuit's current 'flat-rate/unlimited usage' service would have to be repiced on a per-usage basis, incorporating the \$7 to \$9 per-hour access charge. It is doubtful that the service could survive at this inflated rate." The demise of PC Pursuit would be followed by the demise of innovative work on and for microcomputers and telecommunications.

Individuals, small businesses, non-profit organizations, and libraries are likely to be hit hardest and most directly by the proposal's sanctions. Many libraries around the country now offer their patrons electronic database searches. With the added costs, such searches in rural and small libraries are likely to cease because funds are so tight. Even people who now rely on an online search will suffer. Interlibrary loan and book cataloging are increasingly dependent upon interstate telecommunications.

One of the FCC's stated goals is the "elimination of unreasonable discrimination and undue preferences among rates for interstate services." Yet discriminations should be made, especially when you consider that phone companies provide all sorts of special arrangements for toll carriers, including switching machines costing millions of dollars and special trunking exclusively for toll carriers. Packet-switched networks such as Telenet, however, receive no special treatment. They connect into the local network in the same manner you and I do — through ordinary lines.

Some argue that packet-switched networks make heavier use of these ordinary lines. Heavier use is already priced into business rates, however, about five times residential rates. And the largest expense, having the line installed to begin with, is not dependent on amount of use.

The FCC has not yet recognized that data communication to a mass number of people is a new form of communication. Markets and innovations are only beginning to be developed. Further development will be thwarted if this proposal is adopted.

By all estimations, more people and businesses will suffer than will gain if the FCC's proposal is adopted. With large companies setting up their own connections to bypass the access charges, and smaller users dropping out of the market because of high prices, it would seem that eliminating the exemption will impede one of this country's greatest assets in world competition: innovation from the free flow of information.

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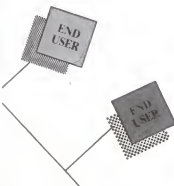
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Documentation consultant Bruce Miller is author of *The Irrelevant Guide to Technical Writing* and board member of the Telecommunications Users Group, P.O. Box 43254, Seattle, WA 98145.

ISDN Cost, Quality Major Concern of Conference Attendees

By Paula S. Stone

DALLAS — Users attending ICCS-ISDN '87 last week voiced concerns about the cost and quality of ISDN, as well as connectivity issues.

"The entire ISDN program needs to get fired up or it won't happen," said Sherman A. Murphy, assistant secretary and director of communications for the Hartford Insurance Group, in Hartford, Connecticut, in a panel of potential users.

"The customer market demand has not today, shaped the vendor's ISDN strategy or service definition," Murphy told the panel. "This neglect is evident by the poor attendance of users at this conference," he added.

Murphy said that vendors require customers to fund ISDN at an unknown cost. "I'm concerned because the ads stress how much the telephone com-

panies will make off of ISDN, not what the benefits will be to the user," he said.

ISDN vendors on a subsequent panel dodged pricing questions raised by the audience. "We won't commit to the cost of ISDN. The line costs can range from 1.2 to 1.7 times the current price of communication lines," said Richard K. Snelling, executive vice president of networking for Southern Bell Tele-

phone and Telegraph Co. of Atlanta.

"We will not price ISDN. We will price the service to customers, which includes the cost of ISDN, value-added service, range of services, and profit," Snelling added.

Users expressed a wide variety of views of how ISDN will meet their corporate needs. "The Hartford Insurance Group, while well-positioned to implement ISDN, has concerns over quality in a mixed vendor environment along with the more universal problems of reliability and connectivity," said Murphy.

"We see lots of ways to use ISDN," said James D. Wells, management information systems director for the \$100 million Johnson, Rhode Island-based Gorham Division of Textron Inc. "We have not seen vendors being able to identify the needs of the corporation. We have no current plans to expand into data communications or

video."

American Airlines, which has heavy communication needs, said it is apparent that ISDN may fit very well in replacing the current switched service access.

"Until pricing of new services is established, it is difficult to embrace ISDN as the ultimate solution to future communication needs," said Roy Brunson, communications project engineer from American Airlines's Tulsa, Oklahoma, office.

Service availability, network control, quality, performance, and cost were factors cited by Brunson as influencing network decisions.

The conference was the first time the five major constituencies — users, suppliers, carriers, regulators, and investors — served in a forum to share concerns about the future of ISDN, according to Thomas E. Bolger, chairman and chief executive officer of Bell Atlantic Corp.

Workstation System Manages Nets

By Edward Warner

A workstation-based system for managing wide-area networks was announced last week by Codex Corp. Based on the Apollo Domain Series 3000 workstation, the graphically oriented Codex 9800 can configure, monitor, and control

network devices, the company said.

Also included is an integrated database and integration tools for fault, performance, and configuration management. Codex said. Designed for use with the Open System Interconnection

standards, Codex 9800 offers an open architecture so that other vendors may integrate their products with it, and a single system/device interface in order to eliminate protocol differences at the device level. Codex elaborated.

Codex said the 9800 system separates network management into real-time communications and management applications, such as configuration management. It offers screen images, commands, and management tasks that remain unchanged as the network expands. Codex noted.

With a base price of \$61,900, the 9800 will be available in January 1988, the company reported.

Codex Corp., Marsfield Farm, 7 Blue Hill River Road, Canton, MA 02021; (617) 364-2000.



The Codex 9800 lets users perform network management applications concurrently from a single workstation.

Wireless LAN Communicates At 19.2 KBPS Within 300 Feet

By Jeff Angus

A wireless network that accomplishes communications through radio frequency waves has been jointly developed by Technolabs Development of Spokane, Washington, and Ray-Net Communication Systems Inc. of Vancouver, British Columbia.

Ray-LAN uses Novell Network-compatible software and includes an adapter card and independent, video-cassette-size RF transceiver for each computer. Inside a building, computers within 300 feet of each other communicate at 19.2 KHz at speeds up to 19.2 kilobits per second.

Availability is scheduled for

the first quarter of 1988, and the price will be competitive with comparable systems, said Al Tuttle, project manager.

Tuttle said the system will be able to support users working at home at distances up to five miles given proper conditions. He added that the company sees Ray-LAN as useful as a subnetwork, bridging new installations to wired topologies, including Netbios, Microsoft's Net and LAN Manager, TCP/IP, and other layered LAN standards.

The company said FCC licensing for Ray-LAN involves a one-time license for the entire site, including all units. Tuttle said the licensing charge is the same as that for a CB radio.

Ray-Net Communication Systems, Inc., E. 12806 Nora Ave., Spokane, WA 99216; (509) 924-2855.

Gateway Product Links Arcnet to SNA, OSI

By Mark Stephens

A gateway product linking Arcnet to SNA and OSI and two new Arcnet interface boards have been announced by Data-point Corp. and Netdesign, respectively.

Data-point, originator of the Arcnet local area network standard in 1977, said its Vista Gate network communications server allows concurrent 3278, 3287, 3777 Remote Job Entry, IBM Document Interchange Architecture (DIA), and LU 6.2 services over the same SDLC or X.25 data link.

Vista View, Data-point's multitasking, multidwindow interface that functions with Vista Gate, allows up to eight simultaneous 3270, 3770, and IBM host DISOSS/370 sessions on a single workstation, according to the company.

The Vista Gate server is based on an IBM PC AT or compatible with 640K of RAM and a 1.2-megabyte floppy disk drive. The PC must be supplied by the customer or purchased in addition to the Vista Gate list

prices of \$5,495 for a 16-user SNA/SDLC 3270, 3770 server; \$6,245 for a 16-user SNA/X.25 3270, 3770 server; and \$3,245 for an eight-user X.25 server.

In other Arcnet news, Netdesign is shipping network adapter cards for ATs, compatibles, and the Macintosh SE. Netdesign's \$695 Actinet 286 is compatible with both Novell's Netware and Banyan's Vines and uses a proprietary 16-bit interface that Netdesign said will double the data access rate to the on-board buffer memory.

The \$495 Actinet SE is a similar interface card built to conform to the Macintosh SE bus standard, offering transmission rates that Netdesign said are 10 times those of AppleLink and transmission distances of up to 20,000 feet. The card allows transmission over coaxial, twisted-pair, and fiber-optic connections and features what Netdesign calls an exclusive system that expands the LAN buffer to 4K.

Data-point Corp., 9725 Data-

point Drive, San Antonio, TX 78284; (512) 699-7000.

Netdesign, 876 Embarcadero Road, Palo Alto, CA 94303; (415) 326-1321.

PC Expert System Measures Performance of Mainframes

A PC-based expert system for measuring performance of a mainframe operating system has been announced by Applied Data Research of Princeton, New Jersey.

Mindover MVS uses information gathered in an MVS operating environment to draw conclusions and make recommendations about mainframe performance. ADR officials said.

The program identifies bottlenecks before they occur, ensuring peak system performance. ADR said.

Mindover MVS uses its own

communication software, which supports the Irma board, to communicate with the mainframe and its MVS or MVS/XA operating system.

The program runs on IBM PC ATs and compatibles with 580K of RAM minimum and at least 4 megabytes of disk storage. The permanent license price for Mindover MVS, available in the fourth quarter, is \$42,500.

Applied Data Research Inc., Route 206 and Orchard Road, CN-8, Princeton, NJ 08543; (201) 874-9000.

— Scott Mace

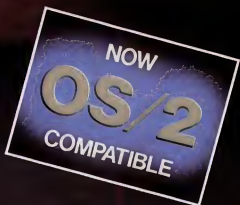


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• USER PROFILE

City of Atlanta Takes Brave Leap Into LANs

Task Force Plans City Network

By Robert Snowden Jones

Atlanta's City Hall was built in 1929, when clunky mechanical IBM adding machines and Underwood typewriters were the leading edge of office automation technology.

The city didn't begin computerizing its burdensome criminal justice and financial data until 1972. It installed most of the data processing equipment in city hall, a striking Neo-Gothic tower that stands on a block catty-corner from the gold-domed State Capitol.

With that kind of approach to automation, it comes as no surprise that just a few years ago a request for a personal computer was typically rejected by the city's budgeters as superfluous.

"Budgeting for PCs was discouraged," said Norrene Johnson Duffly, director of City of Atlanta's Office of Management Systems. About two years ago, however, the data processing department finally convinced the city's leaders to pursue a strategy of nurturing the use of PCs. As evidence that times have changed, plans for a new expansion of City Hall that

"Whether it's twisted pair or cable, we'll be able to have the correct wiring for the new technology." The city is also experimenting with linking computers with fiber-optic cables and microwave stations, he said.

This is heady stuff for an organization that has, until recently, rejected using microcomputers altogether. The city's program for PCs is still in its formative stages. Last year, the Office of Management Systems created an information center managed by Patsy Madariaga, who had been programming on the city's IBM 3081 mainframe for the systems and programming department.

"A lot of people were requesting PCs," said Madariaga of the Office of Management Systems' reasons for starting the information center. "Some people were bringing computers from home." When personal computers were finally introduced in quantity, Madariaga said, someone from data processing would bring them into an office, put them on a desk and say, "here it is."

Madariaga set up a microcomputer resource center in City Hall, where she and analyst Rowland Welsh conduct training classes, consider requests for PCs, and answer calls from frustrated users.

Madariaga said that in order to stay in touch with users' needs in the city's diverse departments, she taps into a valuable "human network" made up of each department's most computer-savvy persons. In almost every city office there is at least one person who takes a higher than usual interest in personal computers, according to Madariaga.

The center also supports a city employee user group.

"We've told the user that it's no longer against regulations to try to be productive," said Duffly of the city's new outlook on microcomputer usage.

Duffly and her staff have not decided just how far they will go in networking PCs with some of the city's larger systems. It would not be an easy task because, like Atlanta's rambunctious growth, the city's computer system seems to have happened without any sort of planning.

At the heart is an IBM 3081, which supports about 500 ter-



Atlanta has finally started planning for PC and network growth, according to Patsy Madariaga (left), analyst Rowland Welsh (center), and Norrene Johnson Duffly of the Office of Management Systems.

minals scattered throughout the city in 40 locations. It is used primarily to house and manipulate the city's criminal justice system records. The rest of the system is devoted to financial and other matters.

Word processing is accomplished primarily with an IBM 8150 multiuser system.

"We're basically an IBM shop," explained Madariaga. The mainframe handles about 80 percent of all of the city's computing workload. Other systems have made their way into the city because of their capability to handle specialized tasks.

The Water Bureau uses a Hewlett-Packard minicomputer to compile data from hand-held meter reader devices. It batch-uploads the data to the mainframe.

Two Digital Equipment Corp. Microvax minicomputers are used at the Motor Transport Division, and the Water Bureau uses a DEC Vax for water flow control. Those systems are independent of the mainframe.

The city recently bought a Wang multiuser word processing system for exclusive use by the city council. Local area networks were considered, but the city decided on the Wang system because of a complete service and support agreement, said Mack.

"A problem was that because city council is such a political area, we were more concerned with support and maintenance than performance," Mack said. "LAN vendors don't give that level of support and maintenance."

With the exception of the Wang system, multiuser word processing is on its way out in city offices, Duffly said.

"We don't encourage diffusion on the IBM 8150," Duffly said. "We've found that historically there's not a need for central word processing systems."

Mack said the IBM word processor, which was purchased in 1982, has become a major support problem, especially since it is so difficult to teach new employees how to use it. "Those who know how to use it seem to like it," he said.

About 50 of the mainframe's terminals are IBM PCs that emulate IBM terminals using Digital Communications Inc.'s Irma communications boards and software. Another 200 PCs, mostly IBMs with a smattering of Compaqs and Macintoshes, are distributed throughout the city in various offices.

Currently, the Irma-equipped PCs can only act as transaction terminals: no data can be queried or downloaded. Duffly's office is currently evaluating a fourth-generation language for the IBM mainframe that will permit querying.

"What end-users want is access to data," said Mack. "Even if they could access it right now, it wouldn't be in a format that they could use."

A LAN study is being conducted in anticipation of the purchase of larger numbers of personal computers.

A LAN will probably be installed in the purchasing department, Madariaga said. And the LAN task force is looking at having built-in LANs in the new building. She remains skeptical of industry experts who say all PCs will eventually be networked. "There's still a need for plain old office automation that doesn't need to tap into other systems," she said.

Duffly agrees. She isn't convinced that LANs are necessary

in many of the city's applications. When the city does buy LANs, it may look for ones that cause a minimum of fuss rather than ones laden with features.

"I'm committed on a very simple scale," Duffly said. "I want to see a file server with spokes and very basic polling techniques. I don't want to get a system that's more sophisticated than users can benefit from."

Duffly also has reservations about electronic mail, especially on the mainframe.

"I have this fear of having 8,000 employees getting on terminals and sending messages at the same time," Duffly laughed. She prefers voice mail over electronic mail for many of the



Norrene Johnson Duffly said she's committed to LANs, but doesn't want a system more sophisticated than users can benefit from.

city's applications. "Our departments don't have that much need to send documents to other organizations in the city," she said.

Duffly's overall philosophy about PCs is that the Office of Management Systems should act in a consulting role with end-users, rather than dictate how they use personal computers. "In general, we're standing out of the way so they can have productivity," Duffly said. "We stand by on the sidelines as a guide to help them get it done."



Patsy Madariaga set up a resource center in City Hall to give classes, consider PC requests, and answer calls from users.

began this summer are taking into account the future needs of networking PCs.

A major building expansion to City Hall that started this summer has given the Office of Management Systems a chance to plan ahead. A task force is planning how PCs will be used in the new wing and is taking advantage of the opportunity to make sure they can be networked.

"This is a once-in-a-lifetime chance to get the proper wiring scheme in place," said Gary Mack, manager of the city's computer systems planning and research division. The data processing people have been dragging cables through the cramped inner recesses of the old City Hall for years, he said.

"We're now soliciting bid proposals for a company to handle the design and installation of the wiring," said Mack.

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News Briefs

Instant Recall to Provide 2 Prolog Tools Versions

A new source code library for programmers of either Arity Prolog or Borland International's Turbo Prolog is available as a productivity tool from Instant Recall.

Prolog Tools is available in versions for the Arity or Borland Prolog implementations. The \$99 products include a high-level tracer; a program executive for tracking flow; backtracking control predicates; list, tree, and string libraries; a math library; and a tutorial-library program.

The products are designed to help developers use Prolog for general business as well as AI applications.

Instant Recall, 5900 Walton Road, P.O. Box 30134, Bethesda, MD 20814; (301) 530-0898.

Contest Seeks the Most Disorganized Hard Disks

Disorganized hard disks can win prizes in a contest sponsored by hard disk utility developer Access Softex.

The developer of the Microsoft Windows-based Dragnet will award each of the 100 most chaotic entrants a beta test version of their software solution, an unannounced product that cleans disorganized hard disks, as well as a discount on the document search program Dragnet.

The company said entries should consist of a printed directory structure and file listing for the hard disk, and "a short description of the tragedies and traumas the disorganization has caused." The deadline for entries is October 31 and should be submitted to the company with an envelope marked "Contest."

Access Softex, 3204 Adeline St., Berkeley, CA 94703; (415) 654-0190.

Personal Checks Toolkit Doubles as Learning Aid

Personal Checks Toolbox from Computech is now available as both a source code library of Turbo C routines and a learning aid for beginning C programmers.

Computech's aim is to show a new programmer the source code and to see how ROM BIOS, DOS, and other C functions are written by providing a model to follow.

Personal Checks Toolbox, released last month, costs \$75.

Continued on Page 22

ARTIFICIAL INTELLIGENCE

AI Users Get More Than Hard-Dollar Returns

Systems Serve Many Functions

By Paula S. Stone

Users of artificial intelligence applications are finding increased productivity, reduced training, and other benefits besides hard-dollar returns on investing in expert systems.

"One of the largest benefits is to store knowledge and make it available to others, to leverage knowledge like a stockbroker leverages dollars to his advantage," said Don Smith, supervisor of advanced manufacturing engineering for Ford Motor Co., in Milan, Michigan. Ford engineers use Maintenance Assistance, an expert system they created in January 1986 using Texas Instruments' Portable Computer and Personal Consultant, a shell that helps non-programmers design and use an expert system, said Smith.

The program, used in six Ford plants, replaces a 1,000-page robotics manual and actually goes beyond the printed page to provide an "intelligent service manual," Smith said.

Every moment a machine in the manufacturing department goes unused costs Ford money in manufacturing time lost, Smith said. But diagnosing a broken gear tooth in a harmonic drive took five minutes using the program instead of one week by the older manual method.

"Maintenance Assistance has been so successful, ASEA, our Swedish robotics manufacturer, is expanding our program to include with their own machines as a standard feature," Smith said.

Such AI reference applica-



Ford's robotics repair expert system has automated diagnostics and shortened manufacturing department repair time, said Don Smith.

tions can be useful in any industry with complex data. For example, Purdue University developed and released Grain Market Advisor this spring.

"The program helps farmers determine the best selling alter-

native that would lead to the best selling price," said Bill Uhrig, professor of agricultural economics at Purdue, in West Lafayette, Indiana.

Farmers use the program to identify complex and uncertain variables in 13 different market situations that would take weeks to learn to perform manually, Uhrig said. Farmers can begin using the program in minutes.

For others who experiment with AI tools, the expert system can provide another perspective—similar to having another colleague to consult. At Amoco Corp. of Chicago the public affairs office has for the past few months used Thoughtline, an AI package for writers by Dallas-based Xpercom.

"An expert system is not a silver bullet. It is a tool that imposes discipline to the thinking process in approaching the assignment from a different perspective," said George Miga, director of public and government affairs program development for Amoco.

Firms Must Weigh Canned vs. Custom AI Tools

Companies looking at expert systems must choose between off-the-shelf applications and shell packages to develop custom systems, or they take a dual approach using canned and toolkit packages, said experienced users.

"The decision should be based on the problem you're trying to solve and the correct solution considering the cost, benefit, and level of function needed," said Mark Linesch, product marketing manager for Texas Instruments' artificial intelligence development.

"Buy an off-the-shelf package if it offers an 80 percent solution. Otherwise, buy a shell and build a custom program," said Linesch.

Time and the complexity of the problem to be solved are other factors, said Dennis Pickron, information center manager for the University of Virginia, in Charlottesville.

"You're ahead if you can get a canned package that fits the application, since the risk to develop an expert system is much higher," Pickron said. The university is using a prototype expert system to help diagnose connectivity problems. It developed the system with Knowledge Engineering System software from Software Architecture and Engineering.

Others mix technology to meet their needs. "We have such diverse requirements that we use both types of packages," said a programming supervisor at a major architectural, engineering, and construction company.

"We bought a shell and developed our own programs to criticize the design quality of computer three-dimensional models and select the proper field-handling equipment for specific conditions," he said.

Microlytics Unveils \$59.95 Program for Text Search

By David Warner

A RAM-resident program that searches as much as an entire unindexed hard disk for keywords or phrases was introduced last week by Microlytics Inc.

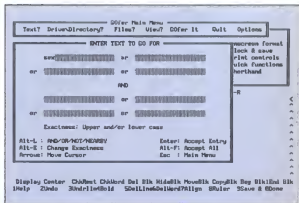
The \$59.95 Gofar lets users search for a word, number, or short phrase, according to Microlytics. To narrow the search, users may select up to seven other words, numbers, or short phrases, specifying their proximity to the keyword, said a company spokesman. The program searches approximately 1 megabyte per minute on a PC AT-class system, said Michael Winer, president of Microlytics.

Once Gofar finds the word or phrase sought, the program dis-

plays it and the 10 lines of surrounding text. That text can be directly imported into a Gofar-compatible word processor such as Microsoft Word, Word Star, Ultimate, Word Perfect, Ultimate Advantage, and others.

After a search, Gofar displays a directory of files that contain the keyword searched and the number of its occurrences in each file, Weiner said.

The program is also rare in its capability to avoid indexing, which can take up time and as much as 20 percent of a file's capacity, and in its speed, Weiner said. Gofar can also be loaded from DOS as a separate



Microlytics' Gofar program lets users search an entire unindexed hard disk for a word, number, or short phrase.

program that takes up 79K of RAM or run as a RAM-resident program. It is not copy-protected.

The program will be available October 1 at its introduc-

tory price, which will increase later to \$79.95, the company said.

Microlytics Inc., Techniplex, 300 Main St., East Rochester, NY 14445; (716) 248-9150.

Tape Compatibility



IBM PC



IBM PC/XT



IBM PC/AT

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Everex extends its leadership in tape backup systems from the existing PC/XT/AT compatibles to the new PS/2 computer Models 30, 50, and 60. We are shipping new tape systems to provide you with complete backup protection against data loss resulting from disk failures.

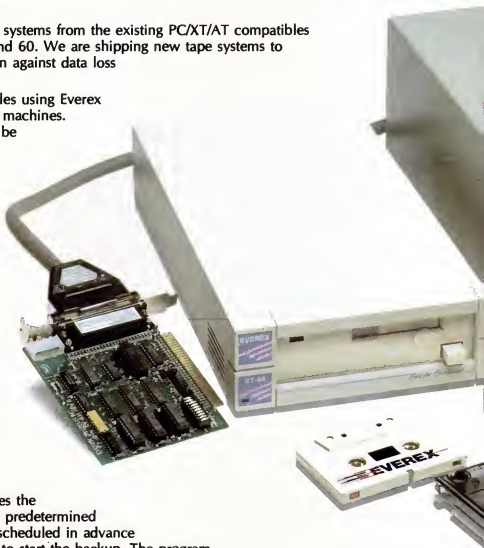
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IBM PS/2 Model 50



IBM PS/2 Model 60

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News Briefs

Continued From Page 19

Computech, P.O. Box 7000-309, Redondo Beach, CA 90277; (213) 377-7198.

Lattice DBC III Libraries to Support Borland International's C Compiler

Lattice Inc. last month announced that its DBC III libraries, which allow C programs to use Dbase III data files, now support Borland International's Turbo C compiler. DBC III enables users to replace or extend Dbase III programs while retaining data files.

DBC III, for single users, costs \$250, and DBC III Plus, for multiuser systems

and solving network database problems, costs \$750. Source code is available as an option. Lattice also offers versions to support both Lattice and Microsoft Corp. C compilers.

Lattice Inc., 2500 S. Highland Ave., Lombard, IL 60148; (312) 916-1600.

United Software Updates Taketwo To Offer File Annotation, Recovery

United Software Security Inc. announced a new version of its Taketwo automatic backup and recovery program that adds a memory resident file manager, file annotation, file recovery, and management reporting.

The \$139 program's pop-up file manager prevents accidental data loss by allowing DOS commands — including Rename, Copy, and Delete — to be

invoked within an application. In addition, users may verify a file's contents without leaving the application.

Taketwo Manager is available now, and free upgrades are available to site and corporate license customers under United Software Security's maintenance program. Other registered users of Taketwo, Version 1.10, can receive an upgrade for \$25 through September 30.

United Software Security Inc., 8133 Leesburg Pike, Vienna, VA 22180; (703) 556-0007.

Boston Computer Society Provides Technical Word Processor Reviews

Reviews of 20 technical word processors for IBM PC-compatible systems are available as reprints from the Boston Computer Society's IBM PC Technical

Special Interest Group.

Reviewed were Chiwriter, The Egg, EXP, Spellbind Scientific, T-Cubed, Tech/Star, Tech/Word, Formath, Micro Tex, PC Tex, Manuscript, MASS-11, PS, Samma Word IV, Techwriter, Word Marc Composer, Excel, Techprint II, Turbo Fonts, and SWO Enhancements to Word Perfect.

The evaluations cover organizational features, page layout, graphics, data interchange, and other factors, as well as benchmark equations.

The reviews originally appeared in the January, February, and April issues of *Notices of the American Mathematical Society*. They are available for \$12, plus 5 percent sales tax for Massachusetts residents.

Carl A. Hein, Dunster House, Apt. 7, Swanson Road, Boxborough, MA 01719.

Microsoft Fortran, Version 4.01 Runs LOG and EXP Functions Faster

Microsoft Corp. of Redmond, Washington, last week announced a faster version of its Microsoft Fortran optimizing compiler. The update speeds the LOG and EXP functions used in scientific applications, as well as fixes a few bugs in the program, according to a Microsoft spokesman.

The new Microsoft Fortran, Version 4.01 updates the compiler released in January and is available free to registered owners of 4.0. Owners of older versions may obtain the upgrade for \$150.

Microsoft Corp., P.O. Box 97017, Redmond, WA 98073; (206) 882-8080.

Quaid Software Releases Envelope Printing Utility for PCs and PS/2s

A RAM-resident envelope printing utility, The Envelope Please, was recently released on 3½-inch disk format by Quaid Software Ltd.

The program lets users import or input an address on a screen and then, with a single keystroke, output it to a printer. It supports Epson and compatible dot-matrix printers, most daisy-wheel printers, and Hewlett-Packard Laserjet compatibles and runs on any PC or PS/2 compatible. It also supports a sideways printing option.

The Envelope Please is priced at \$39 and is available directly from the developer.

Quaid Software Ltd., 45 Charles St. East, Third Floor, Dept. P, Toronto, Ontario, M4Y 1S2 Canada; (416) 961-8243.

North Edge Expands Data Fields In Its Time and Billing Program

North Edge Software Corp. recently released an update to its time and billing system, Timeslips.

Version 3.1 expands data fields to 2,000 characters from 144, and has 250 macros for commonly used phrases, the company said. Built in are new procedural macros for bills and reports.

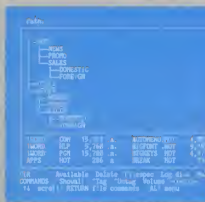
Timeslips can manage 3,400 clients, 250 professionals, and 250 activities. Its report generator can produce 30 types of bar graphs and pie charts and export data to most spreadsheets and databases.

Timeslips 3.1 sells for \$199.95, and registered users of earlier releases will receive \$100 credit toward the new version, the company said.

The program runs on an IBM PC or PS/2-compatible system with 384K of RAM and a hard disk drive.

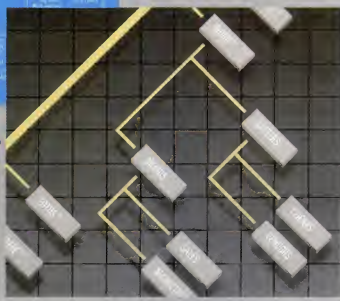
North Edge Software Corp., 239 Western Ave., Essex, MA 01929; (617) 468-7358.

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TECHNOLOGY UPDATE

Airus to License Pattern Recognition Technology

By Jeff Angus

What is touted as the first real-time generalized pattern recognition technology is being licensed now to developers, including Ashton-Tate.

Airus Inc.'s Airus-B technology can handle interstitial parsing and pattern recognition — executing the tasks in the gaps that occur during user input and allowing real-time responses, said Dave Fenwick, Airus president.

A subset of this technology appears in Airus' Write Now word processor. As a user types, the system uses the idle time between keystrokes to check the letters in the word to see if it can either add to or finish the spelling. The user can actually let the program complete a word or phrase instead of typing it in manually.

That subset, Airus-A, is more useful for specific applications, said Sara Spang, editor of *The Spang Robinson Report*, a Palo Alto, California, newsletter that follows trends in artificial intelligence.

Spang said she found that the practical application of having the system complete words did not hinder her writing, but she did find benefits during repeti-

tive entry tasks such as order forms.

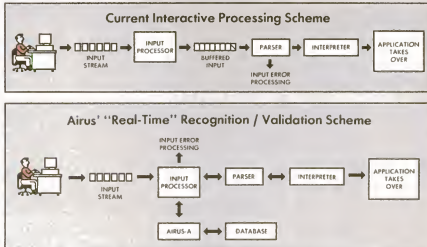
Airus-B can serve as a front end for a wide range of input processing tasks, but differs in being capable of handling virtually any kind of input rather than being optimized specifically for text, sound, graphics, or handwriting, Fenwick said. He expects a wide spectrum of application developers will want to license Airus-B.

For example, Fenwick points to cursive handwriting recognition as a natural task for the technology. Other microcomputer technologies that try to recognize handwritten input are limited and work only from finished writing, he said. Using real-time recognition on connected characters could open new uses for micros, according to Fenwick.

He also expects to see Airus-B techniques used for signature analysis.

"Whereas handwriting recognition requires removing the personality to find the core elements, signature recognition is the opposite," he said. "The important features to recognize are the personality aspects — pressure and speed — not

Airus' Technology Adds Real-Time Validation



Real-time recognition technology differs significantly from traditional pattern recognition technologies. The traditional technologies operate interactively (first figure). They buffer input, parse it, interpret it, and process it. An example would be a grammar syntax checker. It waits for the period, buffers the sentence as a conceptual work unit, parses the elements, and then interprets the syntax. Airus' real-time recognition technology responds to each granule of data as it is added (second figure). The Airus libraries check for recognition against the database during times when the processor is waiting for the human operator. The technology delegates most of the required intelligence to the data structure, making for less code intelligence responsibility and resulting in more compact code (less than 25K) and faster processing.

shape."

However, at least one analyst watching the AI industry said users should not expect applications from the technology soon. "While the technology is impressive, I don't believe the market exists for programs this technology can support. The

users aren't there yet," according to Harvey Newquist, editor of *AI Trends*, in Phoenix, Arizona.

But Fenwick points to such practical applications of real-time recognition as "smart" data entry, command line processing, pattern recognition

similar to OCR, fingerprint and retinal capillary identification, vision systems, and CAD/CAM applications that could complete constructs the way Write Now completes partial words.

Airus Inc., 10200 S.W. Nimbus Ave., Suite G-5, Portland, OR 97223; (503) 620-7000.

Softcraft Pair To Simplify Font-Editing

By Mark Brownstein

A pair of programs that simplify font-editing and make it easier to import fonts into page layout applications are due for release this fall from Softcraft Inc.

The two very different programs were designed to enhance materials printed using Softcraft, Bitstream, or Hewlett-Packard fonts, and work with Aldus' Pagemaker for the PC or Ventura Publisher, Version 1.1.

Font Effects, scheduled to ship at the end of this month, lets a user modify a font for different visual effects. For example, a font set can be given a three-dimensional appearance, with drop shadows, or filled with horizontal lines, squares, or other characters. It can also be rescaled, slanted for custom italics, or reversed. The program is priced at \$95.

The other new program, WYSIFonts, automates font installation into Ventura Publisher, Aldus Pagemaker, or Microsoft Windows with the HPPLC printer driver, converting the font format when necessary, said William Overman, Softcraft vice president.

He said WYSIFonts goes beyond most other font programs by producing screen fonts directly from a printer font specification. WYSIFonts produces font files for HP Laserjet Plus and Series II printers, AST TurboLaser, J laser, or Cordata laser printers. The Ventura version of WYSIFonts will be available in late October, and the Pagemaker version is expected in December, he said. Each version will have a suggested list price of \$95.

Softcraft Inc., 16 N. Carroll, Suite 500, Madison, WI 53703; (800) 351-0500, (608) 257-3300.

Lifeboat Expands Programming Line

By Jeff Angus

Lifeboat Associates has greatly enlarged its Advantage programming tools product line with three new products: a graphics development toolkit, a screen painter, and a screen management source code library.

Quickscreen is a screen painting and building utility designed for corporate environments in which users have 3270 terminals as well as PCs. It supports trans-

action processing and high-level programming and helps users migrate from 3270 to PC environments without suffering the "keyboard shock" of adjusting to the different layout, according to Jack McAuley, Lifeboat vice president of marketing. The \$195 program comes with an editor that allows interactive painting and screen testing, and compiles to object code with a one-key command.

Advantage Graphics is a \$250 object-oriented graphics library for C programmers, designed to give PC programmers the advanced capabilities of Macintosh, Sun and Apollo workstations. The product supports full WYSIWYG ("what you see is what you get") reproduction with such features as automatic aspect ratio compensation and Postscript-style attribute typing. Advantage Graphics works with compilers from Lattice, Borland, and Microsoft.

Panel Plus is an updated screen management library for data entry, display, and editing. The C source code is included in the \$495 product, and the user-altered modules can be recompiled on a different system by using preprocessors define statements. Panel Plus adds functions not in its precursor, Panel, including built-in support for background processing during data entry, 43-line EGA text mode, and the capability to initialize fields larger than the field display window. It supports C compilers from Aztec, Borland, Lattice, Microsoft, and Wizard.

Lifeboat Associates, 55 S. Broadway, Tarrytown, NY 10591; (914) 332-1875.

Ashton-Tate Begins Shipping Multimate Advantage II LAN

By Mark Brownstein

Ashton-Tate Corp. last week began shipping Multimate Advantage II LAN, a LAN version of its Multimate Advantage II word processing program. Single-user versions of Multimate Advantage II began shipping in April.

The LAN version provides all the features of the single-user version, as well as some network support features. Included among the new features are provisions for file and document sharing, as well as shared access

to libraries, dictionaries, and key procedures on the network server.

Printing enhancements to the network release give users access to networked or local printers. In addition, file and document locking are provided. These features can be used to protect a document from being edited simultaneously by more than one user.

The workstation version runs on PS/2- and PC AT-compatible systems with a minimum of

350K of RAM. A 640K server is also recommended.

The program is compatible with PC LAN, Novell Advanced Network 86 and 286, and 3Com 3Plus.

The Multimate Advantage II LAN Pack includes one server and five workstation modules. The LAN version is priced at \$1,595, and additional workstation modules are available for \$150 each.

Users of current versions of Multimate products may obtain upgrade information directly from Ashton-Tate's Multimate customer service department at (203) 522-2116.

Ashton-Tate Corp., 20101 Hamilton Ave., Torrance, CA 90502; (213) 329-8000.

Management Package Runs With Windows

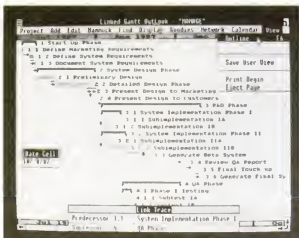
By Peggy Watt

A multilevel project management package that runs under Microsoft Windows is being released this month by Strategic Software Planning Corp.

Project Outlook is built around a multilevel "hammocking" scheme that lets users set a goal—designated the hammocking activity— and define it by tasks needed to meet it; or users can build a project schedule from the smaller tasks, said marketing director Douglas Barth.

The program can produce a Work Breakdown Structure (WBS), automatically generating activity codes or critical paths. Barth said. The project manager provides "what if" scenarios and lets users enter data in a schedule or Gantt chart, which are dynamically linked. It also has a built-in outline processor.

Project Outlook handles data



Project Outlook lets the user schedule projects with a "hammocking" structure, in which a handful of tasks are underneath a project goal.

manipulation through Promis, a \$2,999 high-end project management program introduced by Strategic Software in 1984 and which is required to run Outlook, Barth said. The user calls Project Outlook from a shared menu and does not see the Promis interface.

Barth said Windows answers users' requests for an easier-to-use interface and helps them

adjust to the graphical Presentation Manager.

Strategic Software recommends a PC XT or AT with a hard disk drive and 2 to 3 megabytes of free storage. Project Outlook is priced at \$495 and is available now with a runtime version of Windows 1.04.

Strategic Software Planning Corp., 245 First St., Cambridge, MA 02142; (617) 577-8800.

Tool Eases Screen, Interface Design

By Jeff Angus

Skylights, a new productivity tool from Ergosyst Associates Inc., provides building blocks for easier design of screens and interfaces and has proved a time-saver for several programmers who adopted it.

The company says current users have saved up to 80 percent of the time they budgeted for building user interface modules, either as customized user interfaces or prototypes.

The program is a device-independent development set of editors and utilities. Through a variety of graphical approaches, it supports creation of interactive interfaces without requiring coding.

Options include such standard elements as icons, windows, dialog-up and pull-down menus, dialogue boxes and scroll bars, as well as interactive screens, touch-screen com-

mands, and other uncommon constructs.

Users such as Jerry Horton, microcomputer specialist at Shepard's, a leading legal book and software company in Colorado Springs, Colorado, use Skylights for both the products they develop for sale and in-house efforts.

"What we liked about this package was you don't have to program any of the windows; with the mouse, I just point it," Horton said. Skylights takes only 15 to 20 minutes to build a screen, instead of the usual one or two hours, he added.

Skylights supports both graphics- and text-based programs, and Ergosyst says it will support development under Microsoft Windows and the Presentation Manager in OS/2 Extended Edition. The program already supports the PS/2 VGA systems.

Also included are utilities to import other programs' images, a demonstration program facility, and a report generator.

Skylights is designed for use by C programmers, with bindings for common C compilers, but company president John Burch said Ergosyst will produce bindings for other languages.

The text-only version of Skylights costs \$295, and the graphics version costs \$750. A demonstration disk costs \$10. Ergosyst Associates Inc., 910 Massachusetts St., #602, Lawrence, KS 66044; (913) 842-7334.

Graphstation, Version 3.0 Offers Vector-Based Graphics

By Paula S. Stone

Software Clearing House will ship next month an update of Graphstation, featuring vector-based graphics instead of the earlier raster-based product for easier portability among systems.

Under Version 3.0, work created in one environment can be used in any other, including CGA, EGA, Compaq, and Hercules, said a company representative. Graphstation reads and writes Lotus 1-2-3 and Symphony files, and VGA support will be available in the fourth quarter of this year, the spokesman added.

The \$595 product runs on an IBM XT, AT, or compatible with 512K of RAM and a 10-megabyte hard disk drive.

The company also is adapt-

ing Graphstation for the AT&T Targa 16 videographics board under an OEM agreement with AT&T Graphics Software Labs. It has decision analysis and business presentation graphic images that can be generated on a digital film recorder or Postscript device to create 35mm slides, transparencies, or draft copies. That version is scheduled for release in early October, marketed as Imagestation exclusively by AT&T Graphics Software Labs.

Software Clearing House Inc., 771 Neeb Road, Cincinnati, OH 45238; (513) 451-6742. AT&T Graphics Software Labs, 10291 N. Meridian, Suite 275, Indianapolis, IN 46290; (317) 844-4364.

Programs Help Repair Damaged Dbase Files

By Scott Mace

Damaged Dbase files are rising. Lazaruslike, out of database limbo with the help of two new file repair programs.

The utilities automate previously time-consuming techniques, and, for the first time, publishers say they can reconstruct "zapped" Dbase files—if users realize their error immediately.

Comtech Publishing Ltd.'s Dsalvage uses pattern recognition to strike a damaged partial record and eliminate displacement of data within records.

Dsalvage was created by popular demand after publication of a book, *Salvaging Damaged Dbase Files*, which contained procedures and printed Basic programs that analyze and recover damaged files. (See "New Recovery Methods Help Ensure Dbase Data," December 22, 1986.)

Paul W. Heiser, president of the Pittsford, New York-based Comtech and author of that book, said he automated his procedures at readers' request.

The \$99.95 Dsalvage will recover almost all the data in each category of common damage defined in Heiser's book, including files with non-ASCII characters, files with unwanted end-of-file markers in the middle, files with partially overwritten or destroyed file headers, files erased using Dbase's "zap" command, and files that have abandoned clusters somewhere

in the file.

Dsalvage has a header editor, record editor, and a "byte stream" editor to convert Dbase III files to Dbase II; and a query-by-example utility for searching records.

Hilco Software's Quickfix-2, which sells for \$29.95, requires use of Norton Utilities to unzip files and requires users to manually align displaced data within records. But like Dsalvage, it can replace corrupted headers, remove unwanted end-of-file markers, and correlate the Dbase file's record counter with the actual number of records, according to author Lee Hillard.

Comtech Publishing Ltd., P.O. Box 456, Pittsford, NY 14534; (716) 586-3365.

Hilco Software, 11266 Barnett Valley Road, Sebastopol, CA 95472; (707) 829-5011.

DRI Updates 2 Concurrent DOS Systems

By Jeff Angus

Two updates of operating systems from Digital Research Inc., Concurrent DOS XM and Concurrent DOS 386, were released last week.

Concurrent DOS XM 5.2 works with EEMS memory on 8086/8 and 80286 machines, supported by more than 700 multiuser and multitasking applications written to the operating system. The company said the system supports EEMS- and LIM EMS-aware applications and maintains a "high degree" of compatibility with DOS software. The new version adds support for 16-color EGA and AT keyboards and up to four partitions on a hard disk. DRI said.

Concurrent DOS 386 1.1 works on Compaq 386 and fully compatible systems, using the processor's real mode to run a multitasking and multiuser environment. The company said the system can run up to four programs at a time, and a system can support up to ten users. The new version adds more DOS compatibility.

Concurrent DOS XM 5.2 costs \$295 for a three-user system and \$395 for a six-user system. Concurrent DOS 386 costs \$395 for a three-user system and \$495 for a 10-user system. Owners of XM, Version 5.0 or 386, Version 1.0 may receive a free upgrade by contacting the company.

Digital Research Inc., Box DRI, Monterey, CA 93942; (408) 649-3896.

Programmable Calculator Is RAM-Resident

A 40-function programmable calculator is being released as a RAM-resident utility from Chipsoft Inc.

The \$49.95 program, Tally Ho, provides an on-screen 16-digit calculator that handles financial and statistical functions, generates random numbers, and stores numbers, according to the developer.

Calculator totals can be imported to a spreadsheet or other applications, a Chipsoft spokesman said. Built-in sample programs include depreciation, rental property evaluation assessment, and linear regression analysis.

Tally Ho also runs as a standalone program and can print all functions. It uses 70K of RAM and runs on IBM PC-compatible systems.

Chipsoft Inc., 5045 Shoreham Place, Suite 100, San Diego, CA 92122; (619) 453-8722.

—Peggy Watt

News Briefs

Firm Offers Won Under Chassis at Special Prices

Connect Computer Co. Inc. is offering its Won Under expansion chassis for the Toshiba T3100 bundled at special prices with either a Standard Microsystems Corp. Arcnet, 3Com Ethernet, or CXI 3270 emulation board.

The \$349 Won Under attaches to the bottom of a T3100 and permits a PC expansion card to be used with the laptop. With an Arcnet expansion card, it costs \$629; with Ethernet, \$779; and with a mainframe emulation card, \$1,195, the company said.

Connect Computer Co. Inc., 9855 W. 78th St., Suite 220, Eden Prairie, MN 55344; (612) 944-0181.

RSI Offers Upgrade Kit For Toshiba Portables

A dealer-installable upgrade kit that lets users of existing Toshiba T3100 portables add a math coprocessor to their systems has been announced by R. Services Inc.

The upgrade includes an 8-MHz 80287 coprocessor on a piggyback board and is an enhancement of the company's existing upgrade.

The \$599 upgrade, which will be available October 1, does not require system board modification and may be installed by any authorized Toshiba service center.

RSI, 1403 N. Batavia, No. 115, Orange, CA 92667; (714) 532-5220.

Fastback Update Speeds Hard Disk Backup Rate

A new version of Fastback that will perform hard disk backups three times faster than the current version while using less than half as many disks is currently under development.

The special version, designed to work on the Awesome I/O card, takes advantage of the card's data compression/expansion capabilities.

CSSL Inc., which manufactures the Awesome I/O card, said a 20-megabyte hard disk can be backed up in as little as 2½ minutes, filling fewer than five 1.2-megabyte diskettes.

The new version of Fastback will only work on the Awesome I/O board and is expected to be announced at fall Comdex.

CSSL Inc., 909 Electric Ave., Seal Beach, CA 90740; (213) 493-2471; (800) 654-5301.

• PORTABLES

Makers Warning Users to Drain Nicad Batteries

By Scott Mace

Users of certain portable computers are being warned that they must pay attention to how they drain and recharge their batteries or face possible loss of battery performance.

In particular, nickel-cadmium batteries, or nicads, used in portables can lose hours off their operating cycles if users do not drain them fully before recharging, according to several portable manufacturers.

According to manuals for Zenith Data Systems' new Z-183 laptop, users who leave the computer continuously plugged into its AC battery charger or only discharge for a few hours, instead of the full "deep cycle" discharge, can reduce the performance of the battery to as little as 10 minutes. Normally, the Z-183 can run for up to five hours. Zenith said other portables that use nicads are afflicted by the same syndrome.

Further, this battery performance reduction is normally irreversible, according to Kevin Mankin, product development manager for computer systems at Zenith. Some techniques exist for running high voltage through depleted nicads to rejuvenate them, but those are procedures best performed by repair shops, Mankin said.

In the meantime, a debate is growing over whether lead-acid batteries may be superior to nicads.

Hewlett-Packard and Kaypro, among others, use lead-acid batteries because they allow addition of a "gas gauge," telling users how much battery charge they have left. "As lead-acid batteries drain, they have very predictable voltage fall-off,"

said Lew Barton, product support engineer at HP's Portable Computer Division of Corvallis, Oregon.

Nicads, by contrast, exhibit a constant voltage reading until only minutes of charge is left. "All you can do on a nicad battery-type system is provide a low-battery indicator that's going to give you five to 10 minutes of notice," said Matthew Lundberg, marketing manager for hardware products at Grid System Corp., in Fremont, California.

Like Zenith, Grid uses a rechargeable nicad battery. Grid rejected lead-acid batteries because they can only be recharged 200 to 300 times before the maximum full charge time begins to fall off, as opposed to

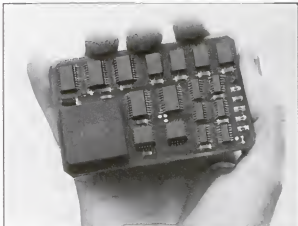
800 to 1,000 times for nicads, Lundberg said.

But Kaypro, makers of the Kaypro 2000 Plus, said its new lead-acid battery will last 500 charges before the charge time begins to erode. "Also, replacing nicads costs more money in the long run," said product specialist Karen Mock.

HP's Barton said the company has added calcium to its lead-acid battery to prolong its capability to run for the maximum length of time.

"Batteries are a very large gray area," Barton said. "People try to draw very sharp lines. So much depends on how the battery is treated."

Grid's Lundberg also disputes Zenith's claim that nicad battery aging is irreversible by normal means. By fully discharging and recharging the nicad, its charge time can be extended, Lundberg said.



The All Chargecard plugs into a computer's 80286 processor socket and lets programs address up to 16 megabytes of non-paged memory. The card requires only extended memory.

Card Addresses 16MB Of Non-Paged Memory

By Mark Brownstein

An add-in card for 80286-based computers allows programs to address up to 16 megabytes of non-paged memory, according to All Computers, the board's developer.

The All Chargecard plugs into the computer's 80286 processor socket and manages system memory to allow up to 16 megabytes of contiguous RAM to be addressed, said Mers Kutt, president of All Computers.

This method is different from some forms of expanded memory, which only allow a user to run programs under 640K inside of a memory window.

The card requires only extended memory, rather than expanded memory and, accord-

ing to All Computer, is faster than extended memory. Memory is broken into 960K partitions, with larger programs running over into expanded memory. The board supports EMS and EEMS, the expanded and enhanced expanded memory specifications.

The All Chargecard will also work in 80286-based machines that are soldered in rather than socketed. Previously available in Canada, the add-in card has just begun shipping in the United States. It has a suggested list price of \$399.

All Computers Inc., 21 St. Clair Ave. E., Suite 203, Toronto, Ontario, Canada, M4T 1L9; (416) 960-0111.

HP Rugged Writer Built For Heavy Office Use

By Eric Lach

VANCOUVER, BRITISH COLUMBIA — Hewlett-Packard Co. announced last week its first 24-pin dot-matrix printer, aiming it at users who need a fast, reliable, and versatile printer for general business applications.

Called the Rugged Writer 480, the \$1,695 machine prints at speeds of up to 480 cps in draft mode and 240 cps in letter-quality mode, said Craig Daniels, HP product manager. The product is now available.

Designed to withstand heavy, continuous use in an office environment, the printer has a 20,000-hour meantime between failures and an unlimited duty cycle, Daniels said.

The printer can produce spreadsheets, reports, forms of up to four parts, letters, and other business documents, as well as graphics with 180-by-

360-dpi resolution, Daniels said.

In addition, three paper paths are selectable from the printer's front panel to accommodate hand-fed sheets, adjustable-tractor friction feeding, and optional cut-sheet feeding, Daniels said.

Users can switch the printer between modes for HP's Primer Command Language (PCL) or an Epson LQ 1000 emulation, Daniels said. Also provided is a 2K buffer, with an additional 16K buffer available with an accessory cartridge that offers four more character sets.

The printer comes with a choice of either RS-232C serial and Centronics parallel interfaces or RS-232C and HP-IB/I/O interfaces.

Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, CA 94303; (800) 367-4772.



The Hewlett-Packard Rugged Writer dot-matrix printer produces high-speed output at 480 cps in draft mode and 240 cps in letter-quality mode. It has a meantime between failures of 20,000 hours.

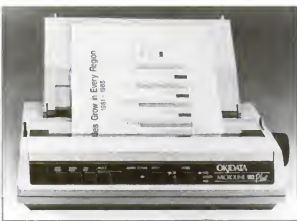
Okidata Printer Is 50% Faster Than Precursor

Okidata recently added the Microline 182 Plus to its series of nine-pin dot-matrix printers. The 182 Plus is 50 percent faster than its sister printer, the Microline 182, the company said.

The new printer runs at speeds of 180 characters per second in high-speed draft mode, 120 cps in utility mode, and 30 cps in near letter-quality mode.

The 9.9-pound bidirectional printer is designed for low-end applications in the home or office and is available with a parallel or serial interface with IBM or Microline emulation.

The Microline 182 Plus offers users a variety of print style options and can produce high-density, bit-image graphics. The printer's front-panel display



The Microline 182 Plus printer runs at 180 cps in high-speed draft mode, 120 cps in utility mode, and 30 cps in near letter-quality mode.

buttons allow users to select print modes and choose a pitch of 10, 12, or 17 characters per inch, Okidata said.

The printer is available immediately from dealers and distributors and is priced at \$319.

In addition, the company

announced it will reduce the price of its existing Microline 182 printer from \$399 to \$299.

Okidata, 532 Fellowship Road, Mount Laurel, NJ 08054; (800) OKI-DATA, (609) 235-2600 in NJ.

—Renee Mathews

Tape Backup Speeds File Searches

By Mark Brownstein

A pair of streaming tape backup products that allow a user to find any file on a tape within two minutes has been announced by Scientific Micro Systems Inc. In addition, the company announced a single-user backup product.

The products, marketed under the Identica brand name, include 60-megabyte, 120-megabyte, and 400-megabyte streaming drives. The 60- and 120-megabyte drives are shipped with a software product called Direct Tape Access. DTA allows the user to rapidly locate any desired file on the streaming tape, the company said.

Using DTA, a directory of all files is stored at the front of the tape. A desired file can be selected, and the tape rapidly advances to the beginning of the selected file. Typical tape units without DTA can take up to a minute per megabyte to locate a desired file on a tape, according to Paul Gulati, director of marketing at Identica. Thus, to find a file on a 60-megabyte tape without DTA could take up to an hour, Gulati said. If a tape's directory is damaged, the tape can be searched sequentially for a selected file.

DTA is available only on the company's 60-megabyte and

125-megabyte streaming backup systems. Those devices and the 400-megabyte subsystem are all compatible with IBM's 6157 tape backup format.

Ontrack, a software package that is said to simplify installation of the devices on a Novell network, is included with the streaming tape subsystem.

The 60- and 125-megabyte drives can be connected to either PS/2 or AT bus computers. The company sells adapters for PS/2 and AT systems. Any of the tape drives can connect to either of the adapters.

The 60-megabyte internal drive sells for \$1,495. The 125-

megabyte internal drive has a list price of \$1,795. External versions of the drives sell for an additional \$200.

The company is also now shipping the Identica 40, a 40-megabyte streaming backup system for Micro Channel bus or AT bus computers. The drives are designed for internal mounting in the AT or PS/2 computers. The PS/2 version has a suggested list price of \$699, while the AT version sells for \$599.

Scientific Micro Systems Inc., 339 N. Bernardo Ave., Mountain View, CA 94043; (415) 964-5700.

Daughterboard Boosts EGA Resolution Up to 640 by 480

By Mark Brownstein

An add-on board that boosts EGA resolution up to 640 by 480, while retaining 16 and 64 color capabilities, is now being shipped by Personal Computer Graphics Corp.

The Photon Maxer is a daughterboard that connects to the feature connector of any EGA card which conforms to the IBM EGA specification.

The add-on product provides resolutions of 800 by 512, 720 by 540, and 640 by 480, with either 16 or 64 colors supported, depending on the monitor's capability, according to Ray Nix, manager of research and development at Personal Computer Graphics Corp.

The resolutions provided produce a 4-to-3 aspect ratio, which the company said pro-

duces a square pixel. The supplied resolution is distortion free on Sony Monitors or NEC Multisync monitors.

In addition, drivers provided by the company or by software manufacturers support most major CAD packages, including AutoCAD, Versacad, Megacad, and P-Cad. Xerox's Ventura Desktop Publisher and Aldus's PageMaker are also supported, as are Microsoft Word and Windows. Most major software packages are supported by the Photon Maxer as well.

The Photon Maxer has a suggested list price of \$159 and is now shipping.

Personal Computer Graphics Corp., 5819 Uplander Way, Culver City, CA 90230; (213) 216-0055.

CMOS Chip Should Pave Way for New Laptops

By Mark Stephens

Offering the possibility of battery-powered AT-compatible laptop computers in the near future, Harris Corp. has announced that it is shipping samples of a low-power CMOS version of Intel's 80286 microprocessor.

The company's new 80C286 processor will operate at up to 16 MHz and consume 60 percent less power than Intel's similar 80286 chip based on NMOS technology, according to Harris. Up to this point, the high power consumption of the NMOS chip from Intel has made it impractical to manufacture laptop computers that would operate solely on internal batteries.

Harris marketing vice president Mike Graf said that 10-MHz and 12.5-MHz samples of the new chip were already available, with full production slated to begin in the fourth quarter of this year. The 16-MHz version will be available in sample quantities during the fourth quarter, with full production scheduled for early in 1988. List prices range from \$125 each for the 10-MHz model to \$170 each for the 16-MHz version, both in units of 100.

As it has with its CMOS version of two earlier Intel

chips, the 80C86 and 80C88, Harris is transferring to Intel its manufacturing technology for the 80C286. Intel will become a second source for the CMOS microprocessor, according to Harris.

Harris Corp., 1025 W. NASA Blvd., Melbourne, FL 32919; (800) 442-7747.

PC Designs Cuts Current Prices, Introduces 286s

By Paula S. Stone

PC Designs Inc. announced last week two new 286-based models and reduced prices on its current 286 and 386 IBM-compatible computers.

Shipping now, the new GV 286 Models 801 and 100 each can contain either a 1.2 megabyte, 360K drive or a 3 1/2-inch, 720K disk drive. The Model 801 runs at 8 MHz with one wait state and has a Maxi-Switch "AT" keyboard. The Model 100 offers 10 MHz with zero wait states and has the Maxi-Switch Enhanced keyboard.

The systems also come with 1 megabyte of dynamic RAM, a Western Digital Controller, a 200-watt power supply, one parallel and two serial ports, and a CMOS clock calendar.

The Model 801 costs \$1,200, and the Model 100 is \$1,425. A 40-megabyte Prim hard disk drive upgrade is available now at \$699, reduced from \$739.

The price of the 12-MHz GV 286 Model 12 dropped from \$2,435 to \$1,950. The price of the GV 386 was cut to \$3,125 from \$3,950, including a Prim 40-megabyte hard drive. Both offer the same basic features as the Model 100.

All of the 286-based computers use the same PC Designs motherboard found in the GV 286 Model 12, the company said. Effective October 1, PC Designs will activate a toll-free number for sales support. That number will be (800) 32 BIT PC. PC Designs, 2500 N. Hemlock Circle, Broken Arrow, OK 74012; (918) 251-7057.



The GV 386 now costs \$3,125.



Identica's tape backup works.

Hardware and software for the business PC.

- 3 1/2" format available from us. Specify when ordering.
 ■ package includes both 5 1/4" and 3 1/2" disks.
 ■ 3 1/2" format available from manufacturer by request. Call us for details.
 CP—copy-protected. NCP—not copy-protected

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software ... NCP

- Keyworks 3.0 ... \$59
 Advanced Graphics 3.0 ... 175
 AlphaTree 1.0 ... 223

American Small Business Computers

- ProDesign II 2.5 (NCP) ... 169

Application Techniques ... NCP

- Plazz 2 D (see what your printer is missing) 35

Ashton-Tate ... NCP

- MultiMate III Plus 1.1 ... call

ATI ... NCP

- How to use DOS, BASIC ... each 33

How to use Lotus, dBase III Plus ... each 43

Borland International ... NCP

- Turbo BASIC 1.0 ... 59

CSiSoft 1.5 ... 51

CEureka 1.0 ... 99

Turbo C 1.0 ... 87

Reflex 1.1 ... 59

Superkey 1.1 ... 59

Turbo Pascal 3.0 (w/BCD & 8087 support) ... 59

WordPro 1.0 ... 31

Breakthrough ... NCP

- Timeline 2.0 ... 259

Crosstalk Communications ... NCP

- CTalk, XVI 3.1 ... 95

Crosstalk Mk. 4 version 1.0 ... 129

Dac Software ... NCP

- Dac Easy Payroll 2.0 ... 32

Dac Easy Accounting 2.0 ... 45

Digital Research ... NCP

- Gem Presentation Team ... 319

Gem Desktop Publisher 1.0 ... 259

Executive Systems ... NCP

- EXTRE 2.0 ... 31

5th Generation ... NCP

- Fastback 5.14 ... 42

Funk Software ... NCP

- Swidways 3.11 ... 89

Genetic Software ... NCP

- Genetic CADD 3.0 ... 69

Headlands Corporation ... NCP

- HyperACCESS 3.2 ... 55

HyperACCESS 3.2 ... 55

Individual Software ... NCP

- Professor Dow (with Smartguide) ... 26

Tyring Instruction II ... 26

Intersecting Concepts ... NCP

- Display Master 2.04 ... 39

Backup Master 2.2 ... 59

Javelin Software ... NCP

- Javelin 1.1 ... 69

Lifetree ... NCP

- Volkswagen Deluxe Plus 1.0 ... 59

Micro Education (MECA) ... CP

- Managing Your Money 3.0 ... 115

MicroPro ... NCP

- WordStar Professional Release 4 ... 259

WordStar 2000 Plus Release 2 ... 229

MicroSim ... NCP

- CR Base System V 1.1 ... 419

Microsoft ... NCP

- Learning DOS (for any version) ... 65

Windows 1.04 ... 65

Quick Basic 3.0 (w/\$20 rebate coupon) ... 59

Quik Basic 3.02 ... 59

Word 3.11 ... \$187

MS Compiler 4.0 ... 279

Migent ... NCP

- Verity ... 119

Monogram NCP

- Dollars & Sense 3.0 ... 105

Nantucket Software ... NCP

- Clipper (Autumn '86) ... 399

Paperback Software ... CP

- DVP-Planner 1.3 ... 57

DVP Info 1.0 ... 57

DVP Expert 1.0 ... 57

DVP Graphics 1.0 ... 57

Paul Mace Software ... NCP

- Mac Utilities 4.1 ... 58

Personics ... NCP

- SmartNotes 2.0 ... 49

SeeMORE 1.0 ... 49

Quarlock ... NCP

- DESIGNVIEW 2.0 ... 79

Expanded Memory Manager 1.0 ... 79

Simon & Schuster ... NCP

- Webster's New World Writer 1.04 ... 59

Hercules ... 2 years

- Hercules Incolor Card (w/RAMont) ... 329

Hercules Graphics Card Plus ... 189

Intel ... 5 years

- Above Board 286 512K ... 349

Intel ... 5 years

- Above Board 386/AT (req. inst. kit) ... 1199

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DCA ... 1 year

- Imra 2 (3270 emulation board) ... \$729

Epson ... 1 year

- We are an authorized Epson service center

Epson ... 1 year

- EX-800 printer (80 cpi, 300 cps) ... 399

Epson ... 1 year

- EX-1000 printer (136 cpi, 9-pin, 300 cps) ... 489

Epson ... 1 year

- FX-866 printer (80 cpi, 9-pin, 200 cps) ... 309

Epson ... 1 year

- FX-2866 printer (136 cpi, 9-pin, 200 cps) ... 449

Epson ... 1 year

- LO-850 printer (80 cpi, 9-pin, 180 cps) ... 495

Epson ... 1 year

- LO-1050 printer (136 cpi, 24-pin, 180 cps) ... 659

Everex ... 1 year

- Everex II 1200 Baud internal modem ... 99

Everex ... 1 year

- Everex II 2400 Baud internal modem ... 199

5th Generation ... 6 months

- Logical Connection 256K ... 319

Hayes ... 2 years

- Smartmodem 1200 ... 299

Hayes ... 2 years

- Smartmodem 1200B (w/Smartcom II) ... 239

Hayes ... 2 years

- Smartmodem 2400 ... 449

Hayes ... 2 years

- Smartmodem 2400B (w/Smartcom II) ... 449

Hayes ... 2 years

- Smartcom II 2.1 (software) ... 89

Hercules ... 2 years

- Hercules Incolor Card (w/RAMont) ... 329

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Miniscribe Corp. ... 1 year

- ScoreCard 30 Meg (68 ms) ... \$479

Mountain Computer ... 1 year

- 40 MB Meg Internal tape Backup (AT or XT) ... 379

Mountain Computer ... 1 year

- DiveCard 20 Meg (80 ms) ... 479

Mountain Computer ... 1 year

- DiveCard 50 Meg (78 ms) ... 569

Mountain Computer ... 1 year

- DiveCard 50 Meg (54 ms) ... 699

Seagate ... 1 year

- FREE PCAT Hard Drive Installation Tape with the purchase of either of the following Seagate drives for the IBM PC, Specity Beta or VHS

Seagate ... 1 year

- 20 Meg Internal Hard Drive (w/Western Digital controller and cables, 65 ms) ... 299

Seagate ... 1 year

- 30 Meg Internal Hard Drive (w/Western Digital controller and cables, 65 ms) ... 339

TEAC ... 1 year

- PC, XT 360K Drive (5 1/4", FD-55B) ... 109

Seek

This is just too easy!

It's rare that we advertise a product by highlighting its main fault.

But, as the New York Times said, *Graph-in-the-Box* from New England Software is "so

easy to use that it may result in far more charts than are really needed." Well, they can be stuffy

about it if they want, but let's face it: there's nothing more fun than instant graphification. With this *memory resident* graphing package you can capture numbers from your screen and transform them into any one of 11 different types of graphs for either analytic or presentation purposes. In seconds. It works with *virtually any program that puts numbers on your screen*—spreadsheets, databases, word processors, etc.—and it's compatible with most popular RAM resident programs and with virtually all applications. It also works with all leading graphics boards, including EGA, and over 100 printers, including the HP LaserJet.

New England Software

Graph-in-the-Box 1.3 (not copy-protected, 3 1/2" available) ... **\$57**

Graph-in-the-Box creates and prints graphs from any program that puts numbers on your screen.

True BASIC, True Power.



Version 2.0 of *True BASIC*, the granddaddy of BASIC programs, continues its stellar tradition of versatility and power. It supports large arrays, matrix algebra, and all the graphic standards (including EGA, CGA, and Hercules). And, it's portable to non MS-DOS machines. To make the deal sweeter, when you buy it you'll get (say the magic word: "FREE!") their Converter program (a \$50 retail value) which lets you convert any BASIC code you have lying around into *True BASIC* code.

True BASIC, Inc. (not copy-protected)

True BASIC 2.0 (3 1/2" available)

w/True BASIC Converter **\$57**

EGA Wizard.



Without *Display Master*, EGA isn't all it could be cranked up to be. Customize colors, fonts, and the number of lines and columns. Special drivers included for 1.2.3, Symphony,

dBase, WordPerfect and others.

Intersecting Concepts (not copy-protected)

Display Master 2.04 (for EGA only, 3 1/2" available) ... **\$39**

PC-Talk4.



Through the wonders of shareware, over 500,000 users have been happily using *PC-Talk* as their communications software for years. Now, the new version, *PC-Talk4* is available for sale. It's a low-cost alternative to more complex and expensive programs. With its own macro language and sound for directions, it's a good deal.

Headlands Corporation
PC-Talk4 (not copy-protected, 3 1/2" available) ... **\$55**

Tip Sheet.



Name: Jeff Stoughton, Sales

Claim to fame: Used to have a marked proclivity for climbing up frozen waterfalls.

If your job is to create eye-bending graphs and charts for your company, you may want an expensive turbo-charged program that will make your presentations look like Hollywood productions. (Well, maybe Burbank.) But if, instead, you need graphs as a practical day-to-day business tool to help you and your colleagues grasp and analyze data quickly, a simple easy-to-use program might make more sense. We like *Graph-in-the-Box* (see above) for just that reason. Memory resident, it can capture numbers from any screen, anytime and turn them into a graph or chart. Which means you only have to learn one set of commands to make graphs with any program you use. Now that's something that just about any business user could use at his or her fingertips.

Publishing for people.



PFS:First Publisher is a solid desktop publisher designed for people without any graphic arts or typographic experience. It has everything you need to print professional-looking documents (newsletters, announcements, etc.) without the complexities of so-called power packages. You can import data via ASCII files from virtually any word processor, and picture files from most of the popular paint programs. Plus, it's fully compatible with many dot matrix and laser printers (including all PostScript compatibles).

Software Publishing (not copy-protected)

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Hyundai Debuts Quartet of Products With Own Trade Name

By Mark Brownstein

A quartet of computer products for corporate users was introduced by Hyundai Electronics America Inc.

The Hyundai products include an AT clone, an XT clone, and a diskless workstation for connection to networks. The products represent Hyundai's entry into the computer market under the Hyundai brand name. The company has discontinued OEM marketing through such resellers as Blue Chip Electronics Inc., which had been marketing Hyundai computers under the Blue Chip label.

The Super-16T computer is a PC clone built around the 8088-2 CPU. It comes standard with 640K of RAM, a

battery-backed clock/calendar, one serial and one parallel port, six expansion slots, and a single 360K floppy disk drive. In addition, the Super-16T has built into the motherboard a floppy disk controller that is capable of controlling two floppy disk drives. The suggested list price is \$999.

In addition, the computer can run at 4.77 and 8 MHz. GW Basic, MS-DOS 3.2, and Electric Desk from Alpha Software Corp. are included with the machine. The Super-16T also comes standard with a 12-inch monochrome monitor and a graphics card that supports MDA, MGA, and CGA output

standards. It is now shipping.

The Super-286C computer is an 80286-based machine that comes with two serial ports and one parallel port. 640K of RAM, one 1.2-megabyte floppy drive, and an on-board floppy disk controller. The computer runs at 8 MHz or 10 MHz. Four 16-bit and two 8-bit slots are also built into the motherboard. The system is shipped with the same software as the Super-16T. The standard system includes a 12-inch monochrome monitor and an EGA card. The Super-286C has a suggested list price of \$1,499 and will begin shipping late this month.

The company will also be offering the Super-286, a 12-slot unit designed to work as a file server. The computer will

have room for five 5 1/4-inch storage devices and will be available for shipping at the end of October. Final configuration of the product has not been announced. The suggested list price is \$1,699.

A diskless workstation called the PC Terminal features a built-in Ethernet LAN interface, four expansion slots, a monochrome monitor, and an AT-style keyboard. The PC Terminal is built around an 8088 CPU and comes with 256K of RAM standard. The PC Terminal is currently shipping and has a suggested list price of \$699.

Hyundai Electronics America, 4401 Great America Parkway, 3rd Floor, Santa Clara, CA 95054; (408) 986-9800.

Personal Computer Products Adds \$2,495 Printer to Its Laserimage Line

A \$2,495 laser printer designed for home use or office workstation environments has been introduced by Personal Computer Products Inc.

The Laserimage 1000, an addition to PCPT's Laserimage family of laser printers, produces a resolution of 300 dots per inch in text and graphics modes and prints at a speed of six pages per minute. It also includes seven resident and 24 downloadable fonts.

The printer is configured with 1 megabyte of standard memory, expandable to 2 megabytes, and is powered by a Motorola 68000 microprocessor. A \$695 upgrade kit that provides a piggyback board with a 68020 CPU and 1 megabyte of ROM is also available.

The Laserimage 1000 is equipped with three standard interfaces: an RS-232 port, a Centronics parallel port, and an RS-422 interface. The printer emulates the HP Laserjet Plus, HP Laserjet Series II, IBM Proprinter, Diablo 630, and



The Laserimage 1000 is designed for home and workstation applications.

Epson FX/80 printers. An optional pop-in cartridge also allows the printer to emulate the HP 7475A plotter.

The Laserimage 1000 will be available from dealers and distributors on October 1, the company said.

Personal Computer Products Inc., 11590 W. Bernardo Court, Suite 100, San Diego, CA 92127; (800) 225-4098, (800) 262-0522 in CA.

— Renee Mathews

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PC Magazine
March 31, 1987

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Genicom Unveils 1020T Dot-Matrix 'Tempest' Printer

By Renee Mathews

Genicom Corp. has announced the latest addition to its family of Tempest dot-matrix printers built to the U.S. government's NACSIM 5100A Tempest standards for data security.

The Model 1020T offers 100-character-per-second (cps) letter-quality and 200-cps data processing printing speeds. It uses an 18-wire printhead and provides a 400-dot-per-inch resolution.

The printer features a 136-column-wide carriage and a tilt-back clamshell design. It allows up to three font cartridges to be inserted and on-line at



The \$3,125 Genicom 1020T prints at 100 cps in letter-quality mode.

Meridian, Microsoft To Offer CD ROM MS-DOS Extension

By Jeff Angus

Because sellers of CD ROM hardware have not been including the drivers needed for their equipment to run with MS-DOS systems, Meridian Data Inc. and Microsoft Corp. have combined to make the necessary systems software available to users.

The Microsoft Extensions product is systems software that adds to DOS the capability to drive a full 600-megabyte CD ROM disk, overcoming the standard DOS 32-megabyte limit on disk storage devices. Users install Extensions through a question-and-answer-format setup program.

Meridian hopes to support the estimated 25,000 CD ROM drives that don't have Extensions and believes that by dealing directly with users, it can address a need manufacturers have ignored.

A Microsoft representative in the CD ROM group said that Amdek Corp.'s recently released CD ROM driver comes with its own software and doesn't require purchase of Extensions. He said the Amdek unit was the first such hardware targeted for end-user purchase.

Meridian is already established in the CD ROM business with CD Publisher, a developer's tool for building CD ROM applications under the High Sierra Group file structure, a proposed standard for CD ROM file format. The cost for Microsoft Extensions is \$50 per unit when purchased singly.

Meridian Data Inc., 4450 Capitola Rd., #101, Capitola, CA 95010; (408) 476-5858.

the same time, the company said.

The printer also offers bidirectional, emphasized, double-strike, expanded, bold, compressed, underscored, and proportional printing. A standard 2K buffer is included, with optional 8K and 64K buffers also available.

Additional options include plug-in personality cartridges that allow the printer to emulate IBM Graphics and Color Printers, Epson FX series, Diablo 630, and Genicom 3000 series printers. A color option kit also provides up to seven-color printing.

The Model 1020T is available immediately from dealers and distributors and will retail for \$3,125.

Genicom Corp., Genicom Drive, Waynesboro, VA, 22980; (800) 437-7468, (703) 949-1170 in VA.

— Renee Mathews

Drives Boost Internal Data Storage Of PC and Macintosh-Based Systems

A line of 5¼-inch external drives that supplements the existing internal storage capacities of PC- and Macintosh-based systems has been released by Century Data Inc.

The Centurion Series is designed for storing large blocks of data. It works with stand-alone computers or can be configured for file server applications in LAN environments, the company said.

Centurion Version I includes a 5¼-inch fixed disk drive and a ESDI/AT 10-megabit-per-second controller and provides storage capacities between 87 to 170 megabytes. Centurion Version II includes a choice of one or two 87-to

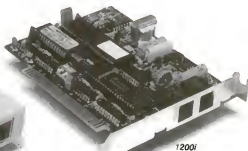
110-megabyte drives and an ESDI/AT or SCSI/AT controller. Version II systems can be connected through bus-level ESDI controllers to a PC AT, or through a SCSI controller and bus adapter to an AT, or directly to the SCSI port of a Macintosh, the company said.

Version I is priced between \$1,360 and \$3,170 for 87 to 170 megabytes respectively. Version II with dual drives lists for \$2,530 to \$5,870 for the same respective storage capacities.

Century Data Inc., CAST Division, 6580 Via Del Oro, San Jose, CA 95119; (408) 224-8030.

— Renee Mathews

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IBM MCA

Continued From Page 1

giving lectures and seminars on the capabilities of the new architecture. "It's like future shock — it's going to be a gradual education process."

Some benefits of the Micro Channel — such as requiring smaller add-in boards as well as allowing switchless installation of those boards — are obvious, said Heath. Other features are more subtle, such as the lower electromagnetic interference generated by the bus and the fact that boards designed for the MCA will be more reliable and problems easier to diagnose and repair.

Some capabilities of the new design have yet to be exploited, said Heath. For example, the MCA can support up to eight "master" microprocessor chips — chips that directly control access to the machine's memory. This could ultimately lead to fault-tolerant systems or computers that run multiple processors.

Finally, the bus was intentionally designed with plenty of room for growth; a significant number of features have been "reserved" for this purpose, and Heath says that even IBM cannot predict how those resources will be used.

"The MCA architecture merely shapes the boundaries of what is possible," said Heath. "It's the PC industry that is going to determine how it is used."

WHY CHANGE THE DESIGN? Contrary to industry speculation, IBM did not deliberately change the bus structure to ensure a proprietary PC design, Heath said. Instead, work on the MCA began in 1983, prompted by problems IBM engineers were having with electromagnetic compatibility (EMC) on its original PC line. IBM also wanted to respond to customer requests for a "switchless" setup of add-in boards and the capability to use more advanced processors.

"We could have shoe-horned a 386 chip into a 286 box without any trouble,"



said Heath. "This would have provided users with increased performance and would have been a generally OK solution."

At first, the main impetus to change the bus design was an FCC requirement that manufacturers meet certain EMC standards to prevent computers from distorting radio and television reception. IBM's original PC XT had difficulty meeting those standards.

"With the PC XT, we had to copper-plate the chassis to make sure that electrical currents returned to the power supply," said Heath. "Then, it still wasn't good enough, so we had to nickel plate it — a very expensive process. We finally got it working, but we spent a lot of money on it and didn't get any increased functionality for our customers."

So meeting FCC requirements was a top priority, said Heath.

IBM also began working on a new bus design because users complained about the difficulties of installing add-in boards due to the plethora of DIP switches on those boards. "No one liked the switches — it took close to an hour just to set a

'The complexity of the Micro Channel is such that it makes educating the industry a difficult job. It's like future shock — it's going to be a gradual process.'

system up," said Heath. "In addition, switches are the No. 1 cause of no problem found diagnoses on service calls — and someone had to eat those costs, either the user or the dealer. So we decided that the switches had to go."

In addition, IBM needed changes in the bus to accommodate advanced processors — such as the 32-bit 80386 CPU — and also wanted to be able to perform true multitasking.

According to Heath, one of the more difficult decisions was to change the size of the bus — the decision that would render existing add-in boards obsolete.

"What may seem obvious now is the result of a lot of soul searching," said Heath. "But once we made the decision to change the physical format, the door was wide open to improve everything."

PRIORITIES. The next stage for IBM was to compile a list of priorities that would determine what features actually got implemented in the new design:

1. Safety
2. Data Integrity

3. System Integrity
4. Reliability
5. Compatibility
6. Functionality
7. Performance
8. Cost

Heath acknowledged that to the PC industry, the surprising aspect of this list is the relatively low priority assigned to functionality and performance when compared to such things as data and system integrity and compatibility.

"Performance is important, but not as important as other things," said Heath, who said that IBM was searching for *balanced* performance that would best suit its customers. "For example, we put a very high priority on data integrity — even listing it higher than system integrity," he said. "The reason? For most people, the value of the data stored in a computer far exceeds the value of the hardware itself."

Heath said that the decision to switch to 3½-inch floppy disk drive media from 5¼-inch format aptly illustrates the use of this prioritized list.

"First, the 3½-inch media is much more reliable, which fits item No. 2 on the list," said Heath. "Since data integrity was more important than compatibility, which was more important than cost, you can see how we made that decision."

Compatibility also came before performance and functionality, said Heath, who said that if IBM hadn't had to worry about compatibility with the existing software base, it could have been much more innovative and thus increased performance in "creative" ways.

"The compatibility issue meant that we didn't have the option of being truly creative," said Heath. "Instead, we had to get away with being clever."

PHYSICAL LAYOUT. The physical layout of the MCA as released in the PS/2 Models 50, 60, and 80 includes three different types of physical connections to add-in

Continued on Page 35

Meeting FCC Requirements a Top Priority in Micro Channel's Design

Of utmost priority when designing the Micro Channel Architecture (MCA) for IBM's new PS/2 line of microcomputers was meeting the Federal Communications Commission (FCC) regulations for electromagnetic compatibility (EMC) — the radioactive emissions generated by a computer that can distort radio and television reception.

"Meeting FCC requirements was a top priority," said Chet Heath, IBM's senior designer of the Micro Channel, who said that many of the most important design changes from the "classic" PC bus were a direct result of EMC issues.

For purposes of controlling EMC, the FCC has created two classifications of computer equipment: Class A for "commercial" computers and Class B for "home" computers.

Class B regulations are much more stringent than Class A regulations because there is a greater likelihood that emissions from home computers would interfere with domestic radio or television reception, according to the FCC.

Computers used commercially are less likely to do so, simply for the reason that there is less television and radio use in industrial parks, office complexes, and other business environments.

"Class B requirements have to be stricter because there are so many opportunities for creating interference in a residential environment," said Bob Cutts, chief of the authorization and evaluation division at the FCC's Office of Science and Technology Laboratory, in Columbia, Maryland.

However, although theoretically the stricter Class B designation is intended to apply only to computers

used at home, that is not the way the guidelines are effectively enforced by the FCC.

Instead, all microcomputers — even the PCs bought for and used in a business environment — are automatically required to meet the tougher Class B standards. The reason for that, according to Cutts, is that PCs are small enough and light enough to be easily transferred between homes and offices.

"Unless there is a solid reason that a computer can only be used — and I mean *only* — in a manufacturing plant or other industrial setting, it is considered Class B," said Cutts.

For example, large mainframe and minicomputers kept in air-conditioned rooms obviously couldn't be moved from a commercial to a home setting, said Cutts. However, desktop PCs could — thus making it necessary to ensure that PC emissions don't exceed a certain limit.

At IBM, work on the MCA began in 1983 precisely because of problems IBM was having with EMC on its original PC line, according to Heath. IBM engineers often were required to perform a lot of last-minute work on PCs simply because they failed to meet FCC standards.

"We were becoming increasingly aware that EMC issues were not being effectively managed," said Heath. "Although we never shipped anything that didn't meet FCC regulations, a lot of dollars were invested in last-minute solutions to EMC problems."

But this last-minute approach to EMC emissions eventually hurt end-users of IBM products, said Heath. "EMC issues always seemed to come up at the end of a design cycle, and we would end up throwing a

lot of money into solving something that didn't bring any enhanced functionality to end-users," said Heath. "It was sort of a sales tax from Mother Nature."

According to the FCC's Cutts, PC vendors are required to send their machines to the FCC to be tested before bringing any products to market. The FCC then determines whether each PC model passes the Class B requirements.

"If a machine meets our technical standards, and if the vendor's application is in good order, then they get an authorization to go ahead and manufacture and market that computer," said Cutts.

Yet at every Comdex show, the FCC makes a point of swooping onto the exhibit floor, seizing any PCs being exhibited without proper FCC authorization. Usually, a significant majority of the machines — estimated between 60 and 80 percent — have violated FCC regulations. (See "FCC Cracks Down on Vendors at Show," June 8.)

"We're aware of a large number of noncompliant manufacturers," said Cutts. "It's really not too surprising — this is a very competitive industry, and prospective vendors want to get their products out the door as soon as possible."

Trade shows are great places to exhibit new PC products, said Cutts — but if a vendor wants to show a machine that hasn't yet received FCC approval, they are required by law to have notice of that fact.

"And sometimes they don't do that," said Cutts.

Companies marketing PCs that haven't been approved by the FCC can be fined or prohibited from selling product, said Cutts.

— Alice LaPlante

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cards. These include:

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- 2) A 16-bit connector with a special video connector
- 3) A 32-bit connector

All connectors are considerably more sophisticated than those on the "classic" PC bus, said Heath. One example is that boards designed specifically for the MCA will have faster input and output for tasks such as controlling ports or disk drives (see sidebar below).

In addition, the architecture was designed to accommodate surface-mount technology and very large scale integration (VLSI). Besides being cheaper, this means that add-in boards designed for the MCA are considerably smaller than PC AT boards.

The smaller size also helps IBM meet ergonomic requirements in European countries, which require the center of the monitor be less than approximately 10½ inches above the desktop.

EASY INSTALLATION. One of the most obvious differences is a feature called "Programmable Option Select," which means that users won't have to worry about setting DIP switches when installing add-in boards. Instead, the Micro Channel essentially replaces switches on add-in boards and on the main system board with a set of memory registers on each card that contains setup information.

The switchless installation has many advantages. It saves installation time and makes it easier to install add-in products. In addition, boards can be easily and automatically reinitialized to prevent conflicts, making it easier to put in multiple identical boards. All told, with an optional extension protocol, the special registers allow users to get more

'Switches are the No. 1 cause of 'no problem found' diagnoses on service calls — and someone had to eat those costs. So we decided the switches had to go.'



than 128,000 switch possibilities.

A side benefit is that now the machine "knows" which cards are inside of it, making diagnosing problems simpler.

Each add-in board designed for the MCA card has its own unique identification number and comes with a disk containing an Adapter Definition File (ADF), a text file that describes which resources each plug-in board requires in order to function.

Whenever a user installs a new board, the information on the ADF is stored in nonvolatile RAM on the main system board; this set-up information is then sent to the appropriate add-in board when the machine is turned on. From that time on, the system knows exactly which boards are installed, which greatly simplifies reconfiguring the machine and diagnosing trouble because of the identification number.

The bus also allows users to create a

"restore" file on disk, which duplicates the information in the setup RAM. This way you could set up your system easily in case you remove the system battery or it fails.

Alternatively, users could completely configure and set up one microcomputer, then insert the boards and use the restore file to ensure that all machines have exactly the same setup — something that's difficult to do on current AT-type machines, considering the multiple DIP switches on most add-in boards.

One crucial element is that each type of board should have its own identification number. In the basic plan, 32,000 such numbers were reserved for IBM, and 32,000 were reserved for independent developers. IBM has acknowledged that developers have had trouble getting through to register their numbers, but said that such problems have been solved (see sidebar, page 36).

BASIC WORKINGS. The MCA was designed to be completely processor independent, relying instead on a default timing cycle of 200 nanoseconds, with extendable cycles for synchronous or asynchronous operations.

Heath emphasized that any processor could be used in the MCA — even non-Intel chips such as Motorola's 68000 family used in the Macintosh and Sun and Apollo workstations.

"Just about any processor will run on this bus — including non-Intel family processors," said Heath. "It is completely processor-independent."

The MCA also includes a special protocol for fast system memory, which allows the use of faster 80-nanosecond, zero-wait-state memory chips in the Model 80.

One major distinction of the Micro Channel is in the way it recognizes and handles interrupts — the signals sent by add-in boards to the central processor.

Both the IBM PC and PC AT use an "edge-triggered" interrupt scheme, meaning that any peripheral that wants to send an interrupt merely has to change the signal level from low to high at the beginning of the interrupt. Heath said. In contrast, the Micro Channel uses "level-sensitive" interrupts, meaning that boards will hold the line active throughout the interrupt process. In addition, some interrupts have higher priority than others. This means that multiple interrupts can be active at the same time, with the system prioritizing and deciding which to operate on.

This makes it easier for add-in cards to share logic with the main system board, and it reduces the possibility of a signal getting lost or of a spurious signal (caused by a faulty board or by outside electronic interference) accidentally causing a problem.

Another, more immediate advantage

The Physical Layout of the Micro Channel Architecture

The final Micro Channel Architecture as released in IBM's PS/2 Models 50, 60, and 80 includes three different physical connections to add-in boards: a 16-bit connector; a 16-bit connector with a special video connector; and a 32-bit connector.

All of these connectors are considerably more complex than the bus used in the original IBM PC XT and PC AT, according to IBM's Chet Heath. With the Micro Channel, there are now multiple signal lines (the means of exchanging information between the system board and an add-in board) as well as more power and ground lines.

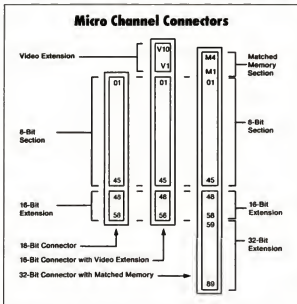
The 16-bit channel was designed to accommodate 77 signal lines, 29 power and ground lines, a separate audio line, and five reserved lines in a 58-position, 50-mil pitch (pin-to-pin spacing) card. In fact, it's divided into a 45-position 8-bit section plus an 11-position 16-bit extension, separated by a space two positions wide to ensure that the board is correctly installed. You can get two signals for each position on either side of the plug-in board.

The 32-bit channel extends this design even further to allow 32-bit memory addressing and data transfer capabilities. It does this by adding 31 signal lines, 15 power and ground lines, and 16 reserved lines to the 16-bit extension.

It also adds a "matched memory section" used to accelerate memory transfers faster than 10 MHz with three signal lines, three power and ground lines, and three reserved lines to the original 8-bit section to accommodate the greater memory addressing, according to Heath.

All told, the 32-bit boards have 93 pins including the matched memory extension.

These boards reflect several major advances over



IBM's MCA includes three different connectors: a 16-bit connector, a 16-bit connector with a video extension, and a 32-bit connector.

those used in AT-type machines — including 386 machines based on the PC AT architecture. Boards designed specifically for the MCA will be able to use more signals for input and output, for such functions as controlling ports or disk drives.

When building PC AT — and 386/AT — machines, board designers used the 16- and 32-bit

capabilities only for addressing memory. Heath said. Such designers continued to build 8-bit boards, rather than 16-bit boards, for input and output, so that their products would work in both PC XT- and AT-class machines.

But in the PS/2 family, the 80286-based Models 50 and 60 have only 16-bit connectors, while the 386-based Model 80 has both 16- and 32-bit connectors, making more sophisticated input and output likely, said Heath.

The MCA also provides a broader distribution of power and ground lines. Every fourth pin is either a ground or power pin, offset on either side of the board by two pins, so that no signal is more than one pin, or .1 inch away from a ground. This reduces the size of the loop made by the electronic signal to one-twentieth the size used in a PC AT. This has several advantages, including the fact that it dramatically cuts down on the electromagnetic interference, and it creates a cleaner, more reliable electronic signal, said Heath. These advantages would be lost if the architecture accommodated even one old slot, he said.

Each machine also has one 16-bit slot with an extra 10-pin video connector; this lets users avoid paying for the circuitry when extending the function to maintain compatibility.

With the video connector on the Micro Channel bus, a new card with a higher graphics standard — such as IBM's 8514 card — no longer has to include the circuitry for backwards compatibility. Instead, it can pass the signal back to the VGA chip on the main system board.

Through this connection, video signals can be merged and synchronized. In addition, images are refreshed at a slightly higher speed in most modes for reduced flicker.

of having interrupts with different priorities is that the number of communications ports has multiplied. The PC AT was designed to accommodate at most two such ports; the PS/2 can accommodate up to eight.

MULTIPLE DEVICE ARBITRATION. The prioritized bus arbitration mechanism on the Micro Channel allows multiple Masters, devices like processors that control their own memory independent of the main system memory. These could be input/output subsystems, graphics coprocessors, or even other central processing units.

The current implementation of the Micro Channel allows for up to eight Masters, in addition to the Direct Memory Address (DMA) "slaves," or devices that do not control their own access to memory, but instead rely on a DMA controller chip.

Printers and communications devices are usually interrupt driven, but would be more effectively used as Masters, Heath said. This could lead to concurrent processing — or, more likely, intelligent subsystems, such as an intelligent disk controller or communications board, perhaps with built-in caching or file encryption.

Assigning these peripherals Master status means that the main system board can act as an "executive," controlling the activities of other processors being used on the system.

Since the MCA allows a number of different devices attached to the system, each working independently, it also needed a way of prioritizing the interrupts from all of these devices — in other words, deciding which requests for bus access are the most important and deserve to be processed first. In MCA jargon this is called arbitration.

Through arbitration, the Micro Channel looks at which DMA devices have requested interrupts and gives the go-ahead to the device with the highest priority.

As part of this scheme, interrupts only go into effect when they are confirmed by both the MCA's hardware and controlling software.

The Micro Channel currently allows for 16 levels of arbitration between devices on the bus. Eight of these levels are assigned to various DMA devices; seven are "reserved" for future use; and the system board processor accounts for the lowest level. In addition, the system board controls two higher levels of arbitration for error conditions and memory refresh, which are not available to devices on the bus. Two of the



currently assigned DMA channels provide what is called "virtual DMA," meaning they can be reassigned among various devices, thus leaving open the possibility of extending the Master concept through many different levels.

For example, such a hierarchical system might permit users to build an "expansion box" containing up to 16 processors or linking to even more expansion boxes. However, Heath said this would require very sophisticated control throughout the system.

Although most devices can accomplish a "transaction" in the single memory cycle granted to them when their turn comes up in arbitration, some devices require multiple cycles to transfer blocks of data. For these, the MCA includes a feature called "burst mode," which allows a device to use multiple cycles.

For example, burst mode allows a disk controller enough time to access multiple disk sectors in one pass, allowing for a 1:1 interface on the disk drives. Combined with the built-in caching scheme, this allowed IBM to use slower hard disk drives without losing speed. In addition, IBM claims that the slower drives are ultimately more reliable and longer-lived than the faster drives.

To manage all this, and to ensure that all devices can get access in a timely fashion, the Micro Channel uses a "fairness" algorithm. The allows devices to use the burst mode, but makes them wait after they get their turn until all other devices have had a shot, regardless of priority.

Fairness and arbitration will be particularly important in moving toward a multitasking, multiprocessing environ-

'What may seem obvious now is the result of a lot of soul searching. But once we made the decision to change the physical format of the bus, the door was wide open.'

ment in the future, said Heath. The current PC AT architecture allows for an alternate Master but has no burst mode and no fairness algorithm, according to Heath.

Tomorrow's systems could allow up to 16 processors with the ability to arbitrate, but to do this you will need an operating system that supports "multiple threads" — in other words, multiple operations continuing at the same time. OS/2 will be one of the first operating systems for microcomputers that allows this.

RELIABILITY. Heath said that several Micro Channel features should make systems based on it more reliable. The number of signals in and out of chips is reduced, thus aiding LSI design.

For example, one issue that often crops up in the IBM PC or PC AT architecture involves how systems react if they receive extra interrupts from a device, due either to a bad board or extraneous electromagnetic interference. Heath said that the MCA has resolved that issue. Unlike the old bus, the Micro Channel can check the state of a board at any time and get a positive acknowledgment of which board sent a given signal. If a board is producing bad signals, the Micro Channel can detect this and report the error.

Similarly, the Micro Channel should be able to detect and then map out a bad sector of memory, allowing you to continue computing even if you have a bad memory chip.

All these features should make it easier to run diagnostics on machines based on the Micro Channel, according

to Heath, who cited this as a major reason IBM was able to drastically reduce its maintenance contracts for the PS/2 as compared to similar contracts for the PC AT.

"Obviously, the best of all possible worlds is that problems don't occur," said Heath. "But the next best thing to that is being able to pinpoint exactly what went wrong."

POSSIBLE IMPLEMENTATIONS. The Micro Channel Architecture makes possible innumerable variations on existing PS/2 hardware, according to Heath.

"Users are going to build things on their computers that you wouldn't have dreamed could be done on a PC," said Heath.

For example, by using a "sleep" signal, users could design a system that contains two identical add-in boards, each working independently. Then, if one board failed for some reason, the system could put it to "sleep" and let the other board continue working. This would allow for fault-tolerant computer operations.

Another option would be to put into a computer multiple concurrent processors, each working simultaneously. For instance, you might be able to put a number of plug-in boards, each containing 386 chips plus their own memory, into a Micro Channel. Even paying as high a price as \$2,000 per plug-in board, users could get a nearly a 1 MIPS/\$1,000 ratio, a vast improvement over today's average, 25 MIPS/\$1,000, Heath said.

ROOM FOR GROWTH. Above all, Heath emphasized, the Micro Channel gives the PC industry room to grow in.

"Just in case IBM didn't think of everything — and we know we didn't — we kept a lot of the potential in reserve," said Heath. "We're waiting to see what ideas the industry can give us with the 16-bit and 32-bit implementation of the Micro Channel."

In 1983, when work on the MCA bus began, Heath said, IBM didn't have the answers, but only knew the problems and limitations of the old architecture — an architecture that technically left IBM no room to grow in.

"Having the knowledge that a solution is required and having the solution itself are two very different things," said Heath. "But never again will we make the same mistake of not allowing ample room for technical growth."

With the Micro Channel, IBM hopes to have an architecture that is applicable not only to the PS/2, but to future generations of machines as well.

Mix-Up of PS/2 Board ID Numbers Resolved

Earlier this summer, there was a furor in the PC industry following reports that IBM was dragging its feet on giving out identification numbers for the Micro Channel. Some board makers even charged that IBM was refusing to give out ID numbers so that only IBM-made boards could be used in the PS/2 family (see "Micro Channel IDs Could Delay Add-Ons," June 8).

However, Chet Heath, the senior design engineer of the Micro Channel Architecture (MCA) said that was nothing more than a misunderstanding.

According to Heath, what happened was this: Third-party board makers were told to call an 800 number to get an ID number assigned to the PS/2 boards they were building; when they called the number, they got what sounded like an answering machine message followed by a beep. At that point, most called their left messages detailing their name, phone numbers, and requests for a PS/2 ID number.

Unfortunately, said Heath, it was not an answering machine but a recorded voice asking them to hold the line until an operator was available.

"And of course they never got a return call from IBM because IBM never got any message," said Heath, who added that he himself had called the number and made the same mistake.

IBM has already taken steps to make getting an ID number easier for third-party board makers, said Heath, who emphasized that IBM never meant to "assign" the numbers, but only intended to assist in making sure that the ID numbers were not in conflict with one another.

Of the 64,000 possible ID numbers, IBM has reserved 32,000 for itself, saying that the remaining 32,000 belong to the industry.

"We could have been greedy and kept those numbers ourselves, but we reserved 32,000 for non-IBM developers," said Heath.

Also contrary to other industry rumors, Heath emphasized that the reason for the ID numbers was not to allow PS/2s to discriminate between IBM and non-IBM cards for proprietary reasons.

But because of the initial problem with readily getting an ID number from IBM, many board makers just went ahead and either made up a number themselves or looked at IBM-made PS/2 boards and used the ID number assigned to them.

This is not a good idea, according to Heath. "I can't predict what might happen if board makers do this," said Heath. "This is not good design practice."

Heath said that if board makers simply kept trying, there will be no problems getting an ID number assigned.

"It's been a busy phone number, but if board makers persevere, we'll assist them in finding an ID number that no one else has used," Heath said.

— Alice LaPlante

News Briefs

Fax Program Supports Background Processing

Solutions Inc. announced software that will enable the new Apple Fax Modem to run in the background with or without the Multifinder.

Mac Fax will support background processing so users can send and receive facsimile documents while working in an application.

The program features Glue, Solutions Inc.'s utility for changing documents with users who may not have the application the document was created in. Mac Fax also supports TIFF output and input conversion.

The program is expected in the fourth quarter.

Solutions Inc., P.O. Box 989, Montpelier, VT 05602; (802) 229-0368.

Heizer Offers Programs For Use With Hypercard

Heizer Software announced it will publish software for use with Apple's Hypercard.

The company will this fall offer a catalog, called Stack Exchange, of available programs, with each priced from \$2 to \$200.

Heizer already publishes programs for Microsoft Works and Excel.

Heizer Software, 1941 Oak Park Blvd., Suite 30, Pleasant Hill, CA 94523; (415) 943-7667.

Letraset Introduces Its Design Training Package

Letraset is now offering a design training package for users of its Ready-Set-Go page layout program.

RSG Design Workshop, an eight-hour modular course emphasizing type and design principles, has an administrator's guide, instructor's notes, reference materials, overhead transparencies, and student notebooks.

The \$795 package will be available in October.

Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653; (201) 845-6100.

Lasercount Tracks Costs Of Desktop Presentation

Lasercount, from Lasercount Systems, tracks costs incurred in creating desktop presentation materials.

With the \$285 program, accounts are set up on the Mac and then sent to the Laserwriter or other Postscript printers.

Lasercount Systems Inc., 103 Blue Ridge Trail, Austin, TX 78746; (312) 327-2778.

• HYPERCARD PRODUCTS

Stackware Development Starting to Pick Up Steam

By Laurie Flynn



If the pace of recent development is any indication, stackware, the term coined by Apple Computer to mean applications written for Hypercard, may just be the new product category Apple hoped to create.

In the month since the product's introduction at the Macworld Expo in Boston, developers have been putting finishing touches on commercial applications ranging from a front end to an artificial intelligence engine to a training system for disc jockeys.

Stackware "shareware" programs are also appearing on bulletin boards in droves. According to one estimate, between six and eight new stackware programs and utilities appear every day on CompuServe and Genie. "I've already downloaded 40 to 50 stacks," said Dan Shafer, a Redwood City, California-based consultant who's developing Stackware and writing a book on HyperTalk, Hypercard's programming language. Shafer is also working on an expert system development environment for Hypercard that he expects to complete before the end of the year.

UME Corp. of Larkspur, California, is working on a project using Hypercard on the Mac II. The application will be the front end for UME's Expert Controller, used for diagnostics and trouble-shooting of industrial machinery. David Sanders, head of the Los Angeles Mac Users Group, is working on a program to train disc jockeys.

Activation plans to publish several Hypercard applications, including a program to aid consultants in the management of their businesses. Written by Danny Goodman, author of the first book on Hypercard, the program is titled *Focal Point*.

"Basically, Hypercard turns the Macintosh into an information appliance," said Brightstar Technologies' Craig Ragland, who is developing Stackware for corporate clients.

While all this development is going on, however, some Hypercard users are discovering the program has limitations. "I thought it was going to replace all of the low-cost file programs, but I'm not so sure anymore," said Ragland. "The worst thing is the performance of the language itself gets bogged down when there are a lot of buttons on one card. When you ask it to process across cards it's very slow."

But despite some uncertainty, the new program has drawn considerable interest from developers and users. According to Shafer, "It gives you a feeling of being in total control."

Mac II Monitor Supports 256 Shades of Gray



The Big Picture IQ monitor is said to simulate 300-per-inch output devices on-screen.

A 17-inch gray-scale monitor for the Macintosh II that supports the simultaneous display of 256 shades is the newest offering from E-Machines Inc. The monitor with a bundled video controller and cable lists for \$2,895.

The large-screen monitor provides capabilities intermediate to color and monochrome technologies, according to E-Machines president Steve Vollum. Its features are currently most useful to desktop publishing and engineering applications.

The goal of the product, The Big Picture IQ, is to display realistic, photographic-quality scanned images or high-resolution text and graphics.

The company's gray-scale imaging technology captures the subtle shadings of scanned im-

ages by displaying an accurate representation of pixels' luminance, according to E-Machines's software engineer Steve Splonzkoski. The company said the product can simulate 300-dot-per-inch output devices on-screen.

The Big Picture IQ has a screen resolution of 1,024 by 808 pixels vs. the Macintosh II's standard 640-by-480 resolution. E-Machines Inc., 7945 S.W. Mohawk St., Tualatin, OR 97062; (503) 692-6656.

— Jeff Angus

Basic Language for Mac Produces Color Graphics Users Can Define Own Colors

By Jeff Angus

True Basic 2.0 will be the first high-level language to take advantage of the Mac II's unique features, charting new territory in its support for color, according to developer True Basic Inc.

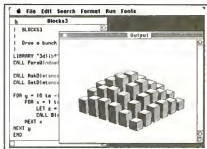
The language, to be released in January, will cost \$99. The previous version of the product had an upward-compatible syntax for controlling Mac II screen graphics. Version 2.0 adds the capability to produce color graphics. Programmers may choose either designated colors or mix their own using a Basic statement.

Importantly, the graphics commands are device-independent, not tied to specific graphics cards or displays, the company said. "True Basic's syntax anticipates the evolution of equipment, both for display technology and printer/ploter offerings," said marketing vice president Stew Chapin. "We're committed to allowing programmers to support new equipment with varying resolutions as that equipment comes on the scene."

Chapin also said True Basic 2.0 is the only high-level language with 68881 math coprocessor support, meaning that floating-point

calculations, especially transcendental functions, will show greater accuracy and considerable speed improvement. In combination with True Basic's recent bundling with scientific and engineering equipment by Perkin-Elmer Corp. and Siemens AG, this performance enhancement, up to 20,000 percent in some cases, indicates the language is emerging as a leading product for numerically oriented applications on the Mac II, Chapin said.

The language now features enhanced editing capability, Modula-2-like subprograms, and both higher- and lower-level ways to access Mac toolbox routines. True Basic code is portable between its various versions, which include Macintosh, IBM PC, Amiga, and Atari ST. True Basic Inc., 39 S. Main St., Hanover, NH 03755; (603) 643-3888.



Three-dimensional graphics will be possible with True Basic, Version 2.0 and the 3-D Graphics Library. True Basic will cost \$99 and support the Mac II's color capabilities.

Aldus Licenses Altsys' Mac Graphics Program

By Eric Lach

SEATTLE — Aldus Corp. has acquired the rights to a Macintosh graphics program and is now readying it for market.

The company recently acknowledged that it had licensed an Illustratortype graphics program, currently dubbed Masterpiece, from Altsys Corp. of Plano, Texas.

"What I am willing to say at this time is that we have a business relationship with Altsys in Texas for a Macintosh graphics product," said Aldus president Paul Brainerd in a recent interview. "It is a licensing arrangement. We are not acquiring the company."

When released, Masterpiece, a Postscript-based illustration program that uses Bezier curves for drawing, will be more than

just an add-on product for Pagemaker, Brainerd said. "It's a substantial application on par with Pagemaker in terms of the benefits to our users," he said.

Stressing that he was not ready to formally announce a product, Brainerd nevertheless confirmed rumors of a relationship between Aldus and Altsys that have been circulating for months.

Altsys president Jim Von Ehr confirmed that his company has signed a marketing agreement with Aldus, adding that Altsys has retained development rights to the program.

Aldus plans to begin private pre-release demonstrations of the program to industry analysts and media in mid-October, Von Ehr said.

Smalltalk Version to Utilize Macintosh II's Speed, Color

By Laurie Flynn

Parplace, a recent spin-off of Xerox's Palo Alto Research Center (PARC), begins shipping this week a version of its Smalltalk programming environment for the Macintosh II that takes advantage of the machine's speed and color capabilities.

The object-oriented Smalltalk programming environment is suited for applications that require dynamic modeling with graphical user interfaces, according to Pat Groves, marketing director at Parplace.

Smalltalk was developed at PARC to support a variety of platforms, including Sun Microsystems and Apollo workstations, and the Macintosh Plus and Macintosh SE. The performance of Smalltalk for the Macintosh II "compares very well to the version for the Apollo and Sun workstations," said Groves.

Applications developed in Smalltalk are easily ported to other environments, said Groves. For example, a program written for Sun workstations can be

ported to the Mac II in a matter of minutes, he said.

As it does with its entire line, the company offers two versions of the Mac II program. Smalltalk CL, priced at \$995, contains all the features standard to the program in all environments. The DE version of Smalltalk is optimized for the Mac environment, including such features as the capability to print from AppleLink. It sells for \$1,295. The program requires at least 2 megabytes of memory.

Smalltalk for the Macintosh SE and Macintosh Plus is also capable of running on the Macintosh II, but it does not support the Macintosh II's color capabilities or the Motorola 68020 microprocessor.

Parplace Systems, 2400 Geng Road, Palo Alto, CA 94303; (415) 859-1000.

Product Permits Automatic Dialing From Hypercard

By Laurie Flynn

Hyperdialer makes it possible to automatically dial telephone numbers from a Hypercard database without tying up the Mac's serial port.

Created by Datasek International, the hardware interface, for use with Apple's Hypercard program, connects to the Mac's audio port and to the handset port of the phone. Because it disables the audio function of the Mac, the unit includes a backup speaker so the user doesn't lose any of the machine's audio capability. The \$29.95 box does not require a modem and uses a regular phone line, said Bill Childress, vice president of Datasek.

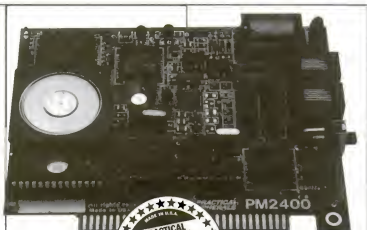
The device is also compatible with Stackware written for Hypercard. Childress added, as well as for other software that may be written with the same algorithm. For example, the Hyperdialer will run with Borland's Sidekick and the next release of Living Videotext's More program, he said. Currently, however, only programs written specifically to work with Hypercard are guaranteed to work with the unit.

"The beauty of the product is that it's a cheap, inexpensive way of having automatic dialing," said Childress. "The benefits are that it's a device that doesn't tie up the serial port — only the speaker port — but you don't lose any of the audio functions of the Macintosh." Production units will be available November 1.

Datasek International, 7650 Haskell Ave., Suite A, Van Nuys, CA 91406; (818) 780-1673.

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Laserpaint Add-On Displays More Than 500 Pantone Colors

Laserware Inc. announced recently an add-on to its Laserprint program that permits the display of Pantone-standard colors.

Laserpaint, dubbed by the firm an Integrated Graphics Workshop, can now display more than 500 Pantone colors on a Mac II with a color monitor. The add-on, called the Color Display Accessory, will be available in October, according to company president Isaac Goff. The price has not yet been established.

The Pantone color matching system, developed and licensed by Pantone Inc., is generally considered the standard for color reproduction.

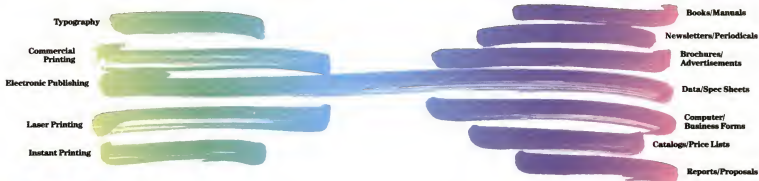
The program can also automatically produce four-color and line-color separations complete with registration marks, and artwork can be printed directly from the screen to Linotronic film, the company said.

A new version that will improve the program's overall performance and feature an improved user interface will be sent free of charge to registered users in October, Goff said. Laserpaint is \$495.

Laserware Inc., P.O. Box 668, San Rafael, CA 94915; (415) 453-9500.

— Laurie Flynn

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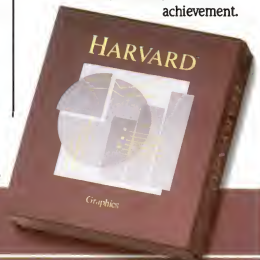
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Q&A

Tandy's Roach: Value Lies in Compatibility, Price

By Paula S. Stone

In August, Tandy introduced the 80386-based Model 4000 and 80286-based Model 1000 TX, machines that continue its well-honed strategy of following IBM's standards with lower priced technology. In fact, the product introduction concluded with the logos of not just Tandy but also IBM and Apple, signifying that Tandy has its eye on market leaders. *InfoWorld* recently sat down with Tandy president and CEO John Roach to discuss Tandy's strategy and the changing PC market.

InfoWorld: What takes Tandy so long in following the lead and introducing products?

John Roach: I'm not sure that is absolutely true. We have taken the lead in our new products. The 1000HX [also introduced in August] represents a higher level of technology than other low-end MS-DOS machines now have.

The Tandy 4000 came out about a year after the Compaq 386 introduction. We are early enough to participate in the real market—the buyers. We demonstrated early our equipment could use OS/2 so people would have the confidence to buy 286 and 386-based machines without fear of being incompatible with future software. Software compatibility, independent of hardware, is the real issue.

You'll see us making moves that will tend to lead the industry. We are doing some things in networking that other hardware manufacturers are not.

Tandy's new advertising focuses on value. How long has Tandy used this strategy and will you continue to use it?

The value strategy is inherent in our basic philosophy. We have focused on it to portray value in the much larger perspective of quality, compatibility, and technology.

Are there any changes at Tandy?

We are developing our strategy to offer the user much more than a clone. I don't know of any other manufacturer who has as



Tandy's primary market is not the Fortune 500; it's the unfortunate 5 million. They have always been Tandy customers.

its primary objective making the low end more usable in the MS-DOS world, focusing on the ease of everything and the value this represents to the market.

With the emphasis on IBM compatibility, what are Tandy's plans to support non-IBM products, such as the multitier IID 6000?

HD 6000 users are mainly Xenix users. We plan to continue to support the customer but have no major enhancements on the drawing board.

Do you care about Tandy's reputation as being a company that doesn't understand big business?

Maybe we ought to turn the question around and say maybe big business doesn't understand Tandy. Big business has not focused on the superior reliability and performance of some of our machines. Tandy's primary market is not the Fortune 500; it's the unfortunate 5 million. They have always been Tandy customers, and we want to nurture and strengthen the relationship. At the same time, the quality, performance, and value in our equipment will let us make gains in the Fortune 500 market.

How are you countering the Radio Shack image of selling low-end electronics and how does this conflict with offering computers?

Tandy's total image has improved significantly. The very availability of these accessories should be considered more of a positive than a negative. Some people are unwilling to focus on our whole better-value concept.

What marketing changes can we expect from Tandy?

We are approaching schools and the government differently and have more people focused in these areas. We are marketing through more different methods, like the VAR program and direct sales programs. We're training our salespeople more and will emphasize networking and accounting. As the year progresses, you'll see more in desktop publishing and wordgroup solutions.

Considering that the PS/2 line promises communications features for workgroup computing, will the stand-alone personal computer continue to exist?

There will be stand-alone computers and those that communicate at differing levels. Instead of options narrowing, they may be broadening because of hardware independence and the capability to communicate with any computer regardless of bus structure. Some of the PS/2 is just selling features. You get different features on a Lincoln than a Cadillac.

MARKETING STRATEGIES

Companies Find Benefits in Previewing Projects

By Rachel Parker

A myriad of concerns keep many computer-related companies from revealing their technological innovations, but a growing number of companies are finding that previews of works-in-progress can pay off.

"In major projects—that is those that take a long time or are very sophisticated—it is important to start soliciting feedback and comments from potential users as early as possible," said Robert Simon, president of PS Publishing, in San Francisco. At the recent Seybold Desktop Publishing Conference, PS Publishing demonstrated some of the features of its PS Collage, a drawing program that when

completed will be available for both the Macintosh and DOS environments.

For QMS Inc., there are three basic benefits to showing future technologies at trade shows, said Robert Owen, manager of public relations for QMS, in Mobile, Alabama. QMS has established technology centers in its booths for trade shows and has shown such projects as color graphics printing. By showing futures early, QMS gets feedback from major accounts, can reinforce its position as a technology leader, and may be able to keep customers from buying competitors' products by showing them what will be available from

QMS. "We want to let the market know where we are going," Owen said.

By far, the greatest advantage is the feedback, vendors agree. "We got a lot of designers stopping by with advice, and users gave us tips on the kind of things they want in PS Collage," said Simon. In addition, demonstrating the product publicly can help a small company in the financial community. "As a smaller company, you have to build positive image in the industry."

In addition, if a product needs the support of third-party software developers, it helps to let them know what direction

you are headed in, Owen said.

"The apparent cost is that we may be giving away proprietary technology or revealing key capabilities," Simon said. "But it would take our competitors as long to incorporate those as it has taken us. They would always be behind, playing catch-up."

Vendors previewing products also run the risk that the audience will believe the technology being shown represents a completed product and that customers will decide to put off purchases, waiting for the newer, more sophisticated product, said Owen. "But that hasn't happened yet. The advantages far outweigh those risks."

News Briefs

Chips and Technologies Launches Design Service

Chips and Technologies, provider of chip sets to IBM PC-compatible makers, is broadening the services it offers customers. With the recent hire of Stephen S. Kahng, designer of the Leading Edge Model D, Chips officially launched its design services operation. Kahng and his staff will help board and systems makers efficiently integrate chip sets into products, according to a company spokesman.

"With higher levels of complexity and concerns of compatibility, it is important to look at the whole system," said a Chips spokesman. The design services operation will assist customers at all stages, even through FCC approval, the spokesman said.

However, the new service does not presage a move into the hardware business. "We don't like the margins in that business," the spokesman said.

Novell and 3Com Report Strong Network Sales

The network suppliers have stopped calling it the year of the network, but Novell and 3Com are both enjoying strong sales. For its third fiscal quarter, Novell reported sales of \$48.7 million, an 87 percent increase over the same quarter last year, and \$5.3 million in net income, an 86 percent increase. President Raymond Noorda said the increase exceeded expectations and reflected strong interest in LAN products.

Competitor 3Com's business is also accelerating. According to a release of preliminary results, sales totaled \$33.1 million for the quarter ended August 31, a 66 percent increase. Net income is estimated to increase 57 percent over the same quarter in 1986.

IBM Sells 5.9 Million Shares of Its Intel Stock

IBM recently sold 5.9 million shares of its Intel Corp. stock, bringing its holding to 7.9 million. An IBM spokeswoman said Big Blue sold the shares for purely financial reasons. In addition, IBM's investment is less critical now that Intel has emerged from its days of losses. The spokeswoman also said IBM is still buying a large number of chips from Intel, and the two companies' technology-exchange agreements are still in force.

Continued on Page 42

AST Research Shifts Focus to Connectivity

By Mark Brownstein

IRVINE, CA — AST Research Inc., which started out a few years ago as a three-man partnership that produced expansion boards for the Apple II and IBM PC computers, is realigning its strategy and image around providing communications products.

Since its founding, AST has tried to move with the market. Last year it leveraged its base in the add-on board market to become a "solutions company," selling its Premium-286 in a variety of configurations for different market needs. With key components in place, AST now hopes to become "the connectivity company."

The company's goal is to provide products that allow organizations to

connect all their PC equipment. "We see the emergence of wide-area networks," said Dan Sheppard, manager of product marketing at AST.

AST Research is "shifting the emphasis onto systems products," Sheppard said. During the next eight months, AST hopes to provide all the LAN bridges and gateways needed to connect Macintosh, IBM PCs, and DEC computers, he said.

In addition, AST is planning to have token ring products available in the first quarter of 1988.

AST plans to improve the speed performance of asynchronous, synchronous, and LAN communications. In addition, AST products will support the trend toward corporate networks and wide-area networks, as well as support the multimedia requirements of its customers, Sheppard said.

Future versions of its LAN, 3270, and 3250 boards will be designed in sets of two — with one supporting the standard PC bus and one supporting the Micro Channel bus, Sheppard said. The company also plans to expand its product for APPC/LU6.2, DIA/DCA, ISO, TCI/IP, and X.25 communications protocols.

Dell Computer Continues Its Expansion; Tandy and IBM Professionals Join Team

AUSTIN, TX — Seven Tandy Corp. managers and other personnel recently moved south from Fort Worth, Texas, to Dell Computer Corp., continuing Dell's strategy of filling its ranks with seasoned professional managers.

"Once Graham Beachum [former Tandy vice president of marketing and sales] was hired as [Dell] senior vice president of marketing and sales, he brought in Tandy and IBM people to make an impact on the company," said John Ellert, Dell spokesman. Ellert said an equal number of new employees have come from Tandy and IBM.

Mark Yamagata, formerly director of computer products at Tandy, joined Dell as vice president of marketing. Dell has

also hired Kent Roberts, Dennis Young, Ed Eagle, and Luanne Kelly from Tandy's marketing division, and Herschel Hochman from manufacturing.

"Dell is a new company that's fast moving and exciting. There's lots of opportunity here," Yamagata said.

A start-up company has the appeal in terms of career opportunity and financial reward, said John Roach, Tandy president and CEO.

In a separate move, Dell has organized the National Customer Support Center under the direction of Ralph Merriman, a former IBM marketing manager. The NCSC will provide technical and other support services.

— Paula S. Stone

News Briefs

Continued From Page 41

Commodore International Realigns, Plans Major Marketing Promotion

With a \$60 million investment from Prudential, Commodore International is getting ready to unleash a major marketing push later this year. The company streamlined all its operations, except marketing and sales, and is booking prime advertising space in Las Vegas for Comdex and television spots for Christmas, according to Rich McIntyre, senior vice president of sales and marketing. McIntyre was brought to West Chester, Pennsylvania, headquarters to turn around the company, which last fiscal year lost more than \$200 million. The sales and marketing realignment has already helped the bottom line. The company expects to report a profit of more than \$20 million for this fiscal year.

More People Planning to Purchase Color Output Devices, Study Finds

Manufacturers of color output devices

likely will find that they have trouble keeping up with demand, according to a recent study conducted by CAP International.

In the survey, CAP found that 48 percent of the respondents intend to buy a color printer or plotter in the next 12 months — double last year's response. Over two years, nearly 75 percent of the respondents said their companies were likely to buy color output devices — with 45 percent saying they definitely would buy.

CAP said the demand for color output devices can be tied to increased use of color monitors and color software, as well as falling prices.

Firm Sells Equity, Distribution Rights to British Manufacturer

Wall Data, a Redmond, Washington, manufacturer of IBM mainframe-to-micro hardware and software, exchanged 30 percent of its equity and extrajurisdictional distribution rights to Atlantic Computers, PLC, in Great Britain, for \$3 million.

Wall Data also received U.S. rights for Orator, Atlantic's voice and data communication product.

SOFTSAL HOT LIST

COMPUTER PRODUCTS

WEEK OF SEPTEMBER 14, 1987

SOFTWARE

Rank	Product	Manufacturer
1	Smartmodem 1200	Hayes • MAC
2	Hercules Graphics Card Plus	Hercules • IBM
3	Smartmodem 2400	Hayes • IBM
4	Smartmodem 1200	Hayes
5	Above Board 286	Intel • IBM
6	EGA Wonder	ATI Technologies • IBM
7	StuPak Plus	AST Research • IBM
8	Hercules Color Card	Hercules • IBM
9	Smartmodem 2400B	Hayes • IBM
10	Long Link	Intellimark
11	Gamecard III	CH Products • IBM
12	Vega Deluxe	Video-7 • IBM
13	Logical Connection	Fifth Generation
14	RAMPage 286	AST Research • IBM
15	RV611C Parallel Interface	M.R.P. Processing • AP
16	IRMA 2	DCA • IBM
17	Bernoulli Box Adapter Card	Imagica • IBM
18	Above Board PS/286	Intel • IBM
19	Practical Modem 1200	Practical Peripherals • IBM
20	Captain Multitask Board	Tecmar • IBM

MONITORS

1	1	78	JC 1401 Multisync	NEC Home Electronics
2	2	24	AT18 Hi-Res Color	ATI Data Systems
3	3	34	410 Amber	Amdek
4	4	32	313 Mono	ATI Data Systems
5	5	6	Color 725	Amdek
6	6	75	Color 722 CGA/EGA	Amdek
7	7	29	EST Monochrome Display	AST Research
8	8	133	Video 310A Amber TTL	Amdek
9	9	5	Video 1280 Hi-Res Monochrome	Amdek
10	10	68	JB 1285 Amber TTL	NEC Home Electronics

HARDWARE

COMMUNICATIONS, SYSTEMS & UTILITIES

1	1	205	CrossTalk XVI	DCA/CrossTalk Communications • IBM
2	2	77	FastBack	Fifth Generation • IBM, MAC
3	4	178	Sideways	Funk Software • AP • IBM
4	5	14	Smartmodem 2400	Persoft • IBM
5	6	384	Moze Utilities	Paul Moze • IBM
6	9	130	Smartcom II	Hayes • IBM, MAC, NT
7	7	53	Carbon Copy Plus	Meridian Technology • IBM
8	6	25	Norton Utilities Advanced	Norton Computing • IBM
9	8	48	XTREE	Executive Systems • IBM
10	10	23	Disk Optimizer	Softlogic Solutions • IBM

LEGEND: AP=Amiga; AP=Apple II series; AT=Atari; AT&T=AT&T; COM=Commodore; IBM=IBM PC/XT/AT; IBM=Apple Macintosh; HP=HP; Mac=Mac; MS=MS-DOS; NT=Novell; SI=Siemens



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Tech Street

By John Gantz

Lotus Is Out of the Financial Woods — and Now Capable of Buying the Forest

If not this quarter, then next, Lotus, the underdog of the software biz, will pass the \$100-million-a-quarter market. While a handful of firms in our industry have grown this fast — Apple, Sun Microsystems, Seagate — they have all been hardware companies. Most of what they sell are iron and silicon in big boxes, which require sophisticated assembly lines to make.

What Lotus sells comes on floppy disks and is shrink-wrapped. For a software company to be a \$400-million money-making machine within five years of its first product shipment is the kind of track record you normally associate with rock stars, hit movies, or a Bill Cosby sitcom.

To me, the company defies rational analysis. Back in fall 1983 when Lotus went public, its product was clearly a success, but its future earnings potential was unknown. The company had cumulative revenues of less than \$20 at the time the prospectus was printed and quickly needed revenues over \$150 million per year to justify the stock's asking price. Only a true believer buying under emotion or faith could expect an 18-month-old start-up to catapult to industry leadership in two years.

The true believers were right. It was possible to build a \$200-million company on the basis of a single software package. And it looks like it will be possible to build a substantial portion of a \$400-million company on a single product.

But where Lotus has done what Micropro hasn't is to prepare for the day that everyone has a copy of 1-2-3 and nobody needs another. The company has managed to sustain revenue and earnings momentum while laying a base for a major product expansion. Lotus invented (or co-opted) the most successful computer programming tool, the spreadsheet, since Basic was invented in the 1960s and is now in the process of building other software to take advantage of the de facto standard.

It hasn't been a total cakewalk. Lotus had, in case you missed it, one year of no growth — the four quarters starting with fourth quarter 1985. Revenues actually declined for two quarters after that.

But then they bounced right back — enough so that for the first time in the company's history, it made more in the first quarter of a year (1987) than in the previous Christmas-season quarter.

What's more, the company has begun to pick up revenue from non-1-2-3 sources — graphics, financial services software, service, and even Lotus magazine. Some of it even the recurring kind that makes life so nice for companies used to selling to first-time buyers.

Although I've worried aloud before whether or not Lotus could break the yoke of single-product status before the product ran out of steam, I think now most of those worries are over. The company has found a way to keep growing at 38 percent a year when hardware shipments are at less than 10 percent — and the company has the wherewithal to acquire more product.

John Gantz is editor of the Tech Street Journal, a newsletter on the high-tech stock market and business performance. The views expressed are his own.

Now I think the thing for Lotus to worry about is whether it can manage its newly sprawling enterprise and maintain the chemistry that allows it to defy rational analysis.

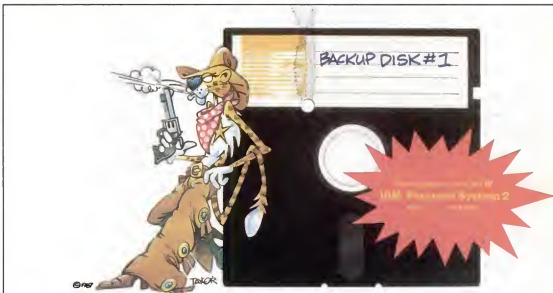
I see a bizarre analogy possible with IBM — a company that grew mainly on the strength of a single product (the 360 operating system) but then diversified into other areas (System/3, word processors, Series/1, etc.). It became successful, too, and suddenly had to devote an inordinate amount of money

and effort to establishing interfaces between its various pseudopods.

So that's what I'd worry about with Lotus: that its diversification efforts would be so successful that it suddenly would have to spend lots of time and effort tying all its products together into a seamless whole. Just getting a mainframe 1-2-3 to be internally consistent with a PC-based 1-2-3 — and yet to work within the architectural constraints of the mainframe — will be tough enough.

But I wouldn't worry too much. The

market may not demand that seamless integration anytime soon. Until then, Lotus has the financial momentum and operating margins to keep it a star. It might even be a reasonable stock buy. It could quite possibly make \$1.50 a share this year (accounting for February's 3-to-1 split) and, with a customary price-earnings ratio of 20 for a software company, be worth \$30 or more — about what it's selling for. It's possible to buy into Lotus now on more than just faith or emotion.



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Tech Talk

By Steve Gibson

Future Multitasking Operating Systems to Take Control of Task Execution

Last week we began discussing some fundamental notions of modern memory management. We saw that operating systems have always acted as our systems' resource managers and that RAM memory is increasingly regarded as a prized resource worthy of the operating system's sophisticated management. We also saw that a system's memory resources are growing increasingly homogeneous. Let's continue exploring these ideas.

As the operating system's responsi-

bilities have expanded to include the management of all memory resources, the application programs running "under" the supervision of the OS have lost this control and management. This means that a running application must now request RAM access from the operating system. In essence it says: "I'm going to be needing about 256K for the next few minutes. Can you spare it?"

The operating system looks out over its landscape of memory resources to see how this application's request can best be

fulfilled. If such a block of free RAM exists, the operating system is able to easily grant the application's request. It updates some internal memory management tables, to reflect that this application now "owns" this region of RAM memory, then responds affirmatively to the request, granting the application access to the designated region.

If no sufficiently large single lump of memory is available, the operating system would instead return a denial to the application, typically informing it of the

size of the largest amount of memory it could have.

If the application is not able to operate within the amount of memory available, it generally issues an insufficient memory error message to the user and terminates somewhat gracefully. Or, if the application is sufficiently flexible, it might be able to operate within available memory constraints, in which case it would adjust itself as necessary and request the amount of memory the operating system indicated it could have.

This is exactly how things function in PC/MS-DOS. However, an exciting alternative awaits applications running in tomorrow's next-generation multitasking operating systems.

In multitasking systems the operating system determines which application is actively running at any given moment. This process of managing the execution of various tasks is called scheduling. The operating system is said to "schedule" the execution of multiple tasks from among those hoping to run.

If, in such a system, the currently running task makes a request for additional memory that the operating system wants to fulfill but which can't be met from the pool of currently available RAM, the operating system has the option of making more RAM available. It can choose to temporarily move an inactive task's RAM allotment to some other location, thus freeing the RAM that was being used. This notion of shuffling RAM around is called swapping.

A system's hard disk is typically used as the "swapping device" since it's usually large and reasonably fast. The operating system creates a temporary file that holds the "swapped out" RAM data, while the space previously occupied by the data is being used for other purposes.

Such a scheme is able to create *virtual memory* since applications can be completely sheltered from needing to know or caring how much real RAM the system has. The system can appear to have as much RAM as the sum of all available memory resources.

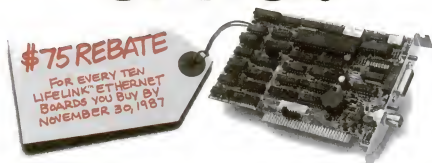
One final subtlety of this scheme is worth highlighting. It's even possible for the currently running application to ask for a single large block of RAM that is larger than the system's entire RAM. Advanced architecture microprocessors like the 80286 and 80386 have memory management units built-in, which can signal the operating system when an application attempts to access various regions of this "virtual" memory space.

An attempt to access RAM that is currently "swapped out" would create a "memory access exception interrupt," which brings this application's access attempt to the attention of the operating system. The OS can then swap in from the disk the block of "RAM" that contains this address and only then allow the application to proceed.

I don't need to tell you that this all gets pretty complicated very fast and is more than just a little bit tricky. This is just part of what Microsoft is trying to get working within OS/2.

Steve Gibson is the developer and publisher of *Flicker Free* and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.

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September 28-30, San Francisco: "Consulting Skills for the IC Professional" deals with the problems in delivering understandable technical information to the business community. Call: (603) 625-4164. Location: Cathedral Hill Hotel. Registration fee: \$795.

October 5-7, Berkeley, CA: The new developments and key issues facing computer managers in the area of data security will be covered in the course "Computer Security Technology and Techniques." Call: (415) 642-4151. Location: University of California at Berkeley. Registration fee: \$625.

October 8, New York: "IBM at the Crossroads: Rebuilding for the Future" is the topic of the first IBM Executive Forum, sponsored by International Data Corp. The day-long series will address issues surrounding IBM's position in the marketplace. Call: (617) 872-8200. Location: Grand Hyatt. Registration fee: \$595.

October 11-14, Cambridge, MA: "Exploring New Frontiers in Software" is the theme of the Software Publishers Association Conference. Speeches by key industry figures and new product introductions will be included. Call: (202) 452-1600. Location: Marriott Hotel. Registration fee: \$450, SPA member: \$725, nonmember.

October 19-21, Cambridge, MA: The Hammer Information Systems Conference will focus on finding the routes to success in implementing strategic technology in the corporate marketplace. Call: (617) 354-5555. Location: Cambridge Center Marriott. Registration fee: \$1,095.

— Carol Czerwinski

InfoWorld welcomes notices of national conferences, trade shows, and meeting schedules of professional data processing, MIS, information center, and microcomputer management associations or support groups. Send notices to: Resources, InfoWorld, 1260 North Road, Suite C-200, Menlo Park, CA 94025. No local training or education seminars, please.

• TRAINING

Mac Packages Help Users Learn More, MS-Works

By Daniel Sommer

Training packages for More and MS-Works are now available from a company that designs exclusively for the Macintosh market.

Personal Training Systems' Learnmore series, announced at the Seybold Desktop Publishing Conference here, comprises three training modules for Living Videotext's integrated processor/presenter for the Macintosh. The series allows users to learn the program at their own speed while using their software, listening to an audio tape, working with a practice disk, and referring to a summary card as a memory aid, the company said. "People seem to learn faster when learning from an experienced software user who lets

them work on the actual application," said Personal Training Systems' president, Susan Barton. "We created a tutorial product based on the notion of a software tutor to help people learn Macintosh business applications quickly and easily."

The first module, The Outliner, is for novices and explains document windows, file export, and changing defaults. The second, Bullet & Tree Charts, assumes knowledge of the outliner portion of the program and covers creating single- and multiple-level charts and special effects and making slide presentations. The third, Tips & Templates, is for advanced users and offers instruction on pattern matching, cloning headlines,

and sorting. The module also offers techniques on maximizing the program features, including handling graphics windows, performing calculations, printing in color, and dealing with templates, according to Personal Training Systems.

Another new package is Master Works, a training series for the spreadsheet-database Microsoft Works. The system consists of three modules, two for the database function and one for the spreadsheet portion of the program.

The first, Database & Form Letters, teaches beginners how to create and modify fields and create and print form letters and mailing labels. The second, Advanced Database, is designed for

those familiar with database construction and use. It shows how to format and calculate fields, design reports, and use shortcuts. The third module, Beginning Spreadsheets, provides an introduction and teaches how to create, print, and sort, the company said.

The audio tape has an instructor who talks users through each lesson, and users practice skills as they are introduced, the firm said. The system requires a cassette player, a Macintosh, and More. Each module costs \$49.95 and contains 90 minutes of training. A 30-day money-back guarantee is offered. Personal Training Systems, P.O. Box 54240, San Jose, CA 95154; (408) 559-8635.

• MEASURING EFFICIENCY

CEOs Require Productivity Gains to Justify PC Costs

By Daniel Sommer

Information center managers are under the gun to prove that personal computers are providing productivity gains to justify their expense, according to a management survey.

The End-User Productivity Survey provides an analysis of major user applications and efficiency gains, critical hard-

ware/software support issues, expansion projections, and major improvement opportunities, according to Brustel Research, a firm that examines computer user productivity and support issues.

"Chief executives officers are asking tough justification questions about current productivity

paybacks, as well as future hardware and software expenditures and anticipated benefits," said Gordon Frank, president of Brustel Research.

Frank sees several factors contributing to increased executive scrutiny of personal computer expenditures:

- Rapid advances in PC technology, software, and communications are pushing spending higher while companies are trying to cut their budgets.

- PC growth has occurred so quickly that firms are still learning to integrate the machines effectively into existing data processing and communication networks.

- Many PC users complain that technical support is inadequate and that they cannot achieve expected gains in productivity.

While information center managers can identify some paybacks, most do not have a standard mechanism for assessing improvements in performance and support in different functional areas, according to Frank.

"In addition, management generally has not distinguished between the needs and impact of 'power' users, whose work affects the success of a business, and standard users, who apply their systems to largely routine tasks," Frank said.

Brustel Research, P.O. Box 330, New Milford, NJ 07464; (201) 692-1358.

Service Converts Design Drawings Into CAD Format

By Daniel Sommer

A new service can now convert manually created engineering drawings into an electronic format for use in CAD systems.

The CAD-Scanning service from Weyerhaeuser Information Systems is designed for companies that need to enter their inventories of manual drawings into CAD systems for future use and modification.

The service converts drawings faster than manual methods and at a savings of 40 to 60 percent, according to WIS. Entering a drawing by hand can take up to 12 hours, but with CAD-Scanner, the time can be reduced by one-third, the company said.

"For companies with thousands of line drawings in inventory, the task of conversion can be far too time-consuming and labor-intensive to handle alone," said Richard Jones, manager of CAD-Scanning for Weyerhaeuser.

"We understand that engineering departments need a way of scanning in design drawings that are now just sitting in

drawers. And that method must be both high quality and affordable," Jones said.

The service uses an Optographics 3000 Scanning System and can translate a document directly into file formats for many CAD systems, including Autodesk's Autocad, according to Weyerhaeuser. For other vendors, the company turns the drawings into the International Graphics Exchange Standard format.

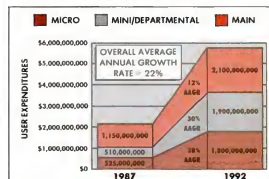
After scanning, each drawing is reviewed, edited, and proofread to ensure correct elements, including line widths, geometries, and text sizes, the company said. The service can also be used to customize extant documents.

The price of the service varies with complexity, volume, and time of delivery. There is a one-day plan for rush jobs as well as a 60-day, ongoing contract for reduced costs, the company said.

Weyerhaeuser Information Systems, CCB3, Tacoma, WA 98477; (206) 924-4200.

• MARKET GROWTH

Forecast for Database Management Systems 1987 - 1992



The market for database management systems will grow from \$2.2 billion in 1987 to \$5.8 billion in 1992 at an average annual growth rate of 22 percent, according to the market research firm Input. The market for PC DBMS alone should grow at an average annual rate of 28 percent over the five-year period.

Apple Offers Training For Desktop Publishing

By Daniel Sommer

Apple has designed a program to offer Macintosh users integrated applications training for desktop publishing, the company said.

The Apple Training Alliance

(ATA) will be taught by Apple-selected third-party training companies and authorized Apple dealers. The courses are intended to provide maximum productivity to Macintosh users

by means of thorough instruction in desktop publishing software capabilities, according to Apple.

"Our goal is to maximize customer satisfaction," said Jerry Devlin, Apple's director of sales and support. "Some users grow accustomed to using a portion of the many functions in a given software package. They know there are more capabilities, and the ATA program will help them use a total desktop

publishing solution."

Apple has already established alliances with one dealer and three training companies to support Macintosh users. The initial members of ATA are Forhan and Wakefield Group Inc. of Westport, Connecticut; Micro Mentor Inc. of Cambridge, Massachusetts; Institute for Advanced Technology, a division of Control Data Corp., in Minneapolis; and national marketer Businessland Inc., ac-

cording to Apple.

The first applications include Aldus' Pagemaker 2.0, MS Word 3.01, MS PowerPoint 1.0, Silicon Beach Software's Superpaint 1.0, and Adobe's Illustrator 1.1, according to Apple.

ATA courses will begin in October. Training prices will vary with length and customization and will be set by ATA members, who will also be responsible for registration, classroom training, and follow-up support, Apple said.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

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VDT Handbook Offers Users Handy Advice

By Daniel Sommer

The issue of VDT health risks continues to crop up for PC and data processing managers. Fueling the fire is the publication of a handbook offering advice to terminal users.

(The Suffolk County [New York] Legislature recently passed a bill that would set standards for VDTs [County Legislature Passes Bill to Set VDT Standards," July 27] and require employers with 20 or more terminals to offer benefits for users. The bill was strongly opposed by local business groups and was later vetoed by the county executive.)

The VDT Book: A Computer User's Guide to Health and Safety offers practical tips on lessening or eliminating vision problems, stress, musculoskeletal ailments, and other health risks of computer work.

"Mounting evidence in the 1980s points to widespread health effects among computer users, and workers often have not been informed about potential risks," said Joel Shufro, executive director of the New York Committee for Occupational Safety and Health (NYCOSH), the publisher of the book. "This book will help anyone who is concerned."

The VDT Book states that problem pregnancies, including miscarriages and fetal abnormalities, among computer users may be related to VDTs or job stress.

The book's author is Mark A. Pinsky, the founding editor of VDT News: The VDT Health and Safety Report, an independent newsletter. The handbook is 48 pages and includes chapters on reproductive risks, radiation, stress, vision, rash, and ergonomics. It also offers guidelines for purchasing VDTs, sample collective bargaining language, and a resources section.

The VDT Book costs \$5 plus \$1 for postage and handling.

NYCOSH, 275 Seventh Ave., 25th Floor, New York, NY 10001; (212) 627-3900.

A User's View

By Jerry Pournelle

Desktop Publishing Is Here to Stay, But the Details Still Need to Be Worked Out

SANTA CLARA, CA.—I'm no great fan of buzz words, and "desktop publishing" is this season's catch phrase. But desktop publishing is here to stay—even if few people know exactly what it is.

Case in point: In the first week of September some 2,000 high-paid and busy people laid out \$600 each to attend the Seybold Conference on Desktop Publishing. I'm sure each one of them has his or her own idea of what desktop publishing is all about, how to do it, and what to do with it when we learn how; but the computer industry is convinced there's a market out there already, and it's growing fast.

In the first ten years of the computer revolution we created the word processor. We've got good ones, and while some people are still holding out, most writing is now done with a computer.

What's called desktop publishing has given us the "page processor." We can now make some pretty good pages. Not as good as the traditionalists can but better than good enough.

The next step is document processing, and we're not really there yet. It should be real soon, though. The harbingers have arrived: At the Seybold Conference I saw a laser-printed hardbound book that required bright light and a strong glass before I could tell it hadn't been set in cold type.

The problem is that programs and systems that manage whole documents are not easy to come by. They work, but they're awkward to use; meaning it's unlikely that your desktop printing will be done or controlled by engineers or the people who create the words to be published, or even by some random employee as an adjunct to other duties.

Controlling a desktop publishing system is complicated enough that it will probably occupy someone whose job is to do that and little else. Thus for some businesses, many expected savings may vanish before they're realized.

On the other hand, for the small businessman who works 18 hours a day and hates to delegate, desktop publishing does offer a low-effort way to create illustrated reports and sales materials without writing checks to outside suppliers—and that may be important.

So presuming you want to get into desktop publishing, what's the best way?

To start, Pournelle's First Law: If you don't know what you're doing, deal with people who do. In this case it's especially important.

A corollary to this rule is that unless you're pretty smart, stick to standard systems that do things in a standard way. You may pay a bit more in the beginning, and your sophisticated technowhore friends will laugh. So be it. You'll still get the job done, and you'll get it done faster than you would with a nonstandard system.

Fine. So what are the "standard" systems? It's easy to answer that, provided you know the ropes. Remember, desktop publishing is at bottom a way to make your computer communicate with a printer to produce a fairly complicated page: text laid out the way you want it and in the type fonts and sizes you like; diagrams and drawings set into the text; and the whole thing arranged in a way that pleases you (if no one else).

That doesn't sound complicated, but

in fact it is. Once you've built the image on the screen, how do you tell the printer to change typefaces in the middle of a paragraph? To leave an irregular hole between two columns for the insertion of a diagram? To write fractions, insert scientific and mathematical symbols, and use the whole panoply of graphics and typographical devices? You could send your printer the odd escape sequences that, say, a standard HP LaserJet Plus needs in order to change from one font to another; but if you do that more than a dozen times, you'll be so exhausted you'll go back to hiring the job out.

In other words, we need a page description language—something that we can use, that our printers understand, and that ideally is as independent of the hardware as possible. There are in fact several such languages, including Imagen's DDL (Document Design Language) and HP's PCL (Printer Control Language). For a while it wasn't certain which one would become the standard,

the right to use a family of type fonts known as the "Adobe fonts." This right goes with the printer, so the end-user can produce books set in Times Roman or another trademarked font without fear of being sued by the font owner.

In addition to the royalty for the use of the Adobe implementation of Postscript, there's the cost of ROMs and their actuators. These parts, including the unpopulated board, cost \$350. Thus a printer manufacturer who wants to stay Adobe Postscript-compatible will pay from \$450 to \$650 per printer, on up to \$800 or more, depending on how many printers he sells. Since printer people are in business to make a profit, they don't pay that; you do.

Is it worth it? In my judgment, yes—with one low-end exception. There are printers that use your Macintosh to do the actual print formatting. These "dumb printers" cost from one to several thousand dollars less than a printer that knows Postscript. The quality isn't bad, and if you're not doing very fancy things, it may be good enough.

Otherwise, go with Postscript.

Naturally not everyone in the industry agrees. Charlie Ying, coinventor of the Atex system (with which *InfoWorld* is produced) says that in a couple of years Postscript will be considered no more than a bad Polish joke. (Most users will never need to know this, but the calculations within the Postscript language—as opposed to the interpretation and implementations—are done in Reverse Polish Notation.) Charlie Ying is worth listening to, but he's vastly outnumbered by others whose views are just as respected.

Now, about fonts. Under U.S. law, any type font that is more than 15 years old can legally be copied and implemented by anyone who cares to take the trouble to do it. On the other hand, many font names have been trademarked, and those trademarks say in effect much longer. Thus Times Roman, commissioned by the London Times in 1931, can be used by anyone; but if you want to call it Times Roman, you have to pay royalties to the Linotype Company.

Until recently, if you wanted to be Adobe compatible you had no choice but to go with the Adobe fonts; and while Adobe offered a reasonable variety, there weren't as many as one might have liked.

That's changed now. The Bitstream Company has taken the outlines of many famous and popular typefaces directly from existing documents (or in some cases from the designer's notebooks) and turned them into computer-readable instructions that are compatible with Adobe Postscript.

The Bitstream fonts are not only Adobe Postscript compatible, they also preserve the width metrics used by Adobe, so that if you buy a Bitstream font you can convert your document to it without fear that your page layouts will suffer any drastic changes.

Of course, once we establish that we need Adobe Postscript-compatibility, we still have a lot of choices; for instance, do we want MS-DOS or a Macintosh system?

That, alas, I can't answer. Macintosh desktop publishing systems, like most everything else in the Mac world, are easier to learn than their MS-DOS

counterparts. Whether they're easier to use is, of course, another question. I don't much care to get into religious debates.

The bottom line is that "desktop publishing" is one more capability your computer—MS-DOS or Mac—can give you, provided you have the right software and the right printer. The capability grows exponentially as you use it.

Jerry Pournelle is a noted science fiction writer and computer columnist. The views expressed are his own.

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A Capital View

By Jerry Schneider

The Real Impact of OS/2 Will Probably Be on Future Software Development

In my last column, I talked about some of the confusion among users concerning Operating System/2. This week, I would like to expand upon that discussion.

Who should use OS/2? Any discussion of OS/2 should first address the minimum system requirements necessary to run the software. OS/2 requires an 80286- or 80386-based microcomputer with a minimum of 2 megabytes of RAM. If you want to use the DOS emulation facilities of real mode, a minimum of 2.5 megabytes of RAM is

required. As you can see, these "minimum" system requirements are quite excessive by today's standards.

This means that OS/2 will not run on the more than 9 million 8088- and 8086-based PCs in use today, unless those machines are refitted with replacement microprocessors and memory.

A second important point, which can not be understated, is that OS/2 is not a replacement operating system for DOS. It is an operating system designed for users who have a real need to take

advantage of some of the advanced features and capabilities of the 80286 and 80386 microprocessors. The most prominent of these features are multitasking (running multiple applications concurrently) and the use of virtual memory.

The multitasking and virtual memory capabilities under OS/2 are only provided in protected mode. This means that any software that is to use these features must be specifically written to access protected mode.

While existing software will run under

OS/2 in real mode (what is often called the DOS compatibility box), that software *cannot* utilize any of the protected mode features, including multitasking or virtual memory.

It is important, then, to understand that OS/2 will not provide any benefit to existing software! If your future computing needs will only include existing software applications, then you should not consider using OS/2.

Many software publishers have indicated that an OS/2 version of their product will be available almost immediately upon release of OS/2. While this may be true, I believe that most early applications identified as "supporting OS/2" will simply be versions that are ported from DOS. While such software will run under protected mode and can therefore be multitasked, it will not be able to take specific advantage of the many features of the 80286 and OS/2.

If you have an immediate need to multitask your existing applications and do not want to do it under DOS (using Desqview, for instance), then you may want to be an early user of OS/2. For the majority of users, however, I would have to recommend against converting to OS/2 just to run ported application software.

Does this mean that OS/2 is of no value? For instance, then you may want to be an early user of OS/2. For the majority of users, however, I would have to recommend against converting to OS/2 just to run ported application software.

OS/2 provides a foundation for the next generation of microcomputing. Although OS/2 provides negligible benefits for users of existing or ported software, it provides software developers with the tools necessary to design the software applications of the future. These future applications should have a profound effect on how computers are used — and by whom — in the future.

Most software developers are already hard at work designing the next generation of products that will take full advantage of OS/2 and the 80286 and 80386 microprocessors.

I would expect that the impact of true OS/2-capable applications could be as significant to the industry as Lotus 1-2-3 when it was first introduced in 1983. As you may recall, even though the 8088-based microcomputer had been introduced in 1981, 1-2-3 was the first application to take specific advantage of the features and capabilities of the 16-bit microprocessor. The technology introduced with 1-2-3 has since revolutionized our industry.

The next revolution is already underway in the research and development labs of most software developers. By the end of 1988, the first of these true OS/2-capable applications should begin appearing. Once they do, watch out!

Who should use OS/2? When should you convert to OS/2? In my view, the time to consider OS/2 is when true OS/2-capable applications are available. When one of these new applications includes features that you must have and that software says "OS/2 required," then the time has come for you to make the transition. Until then, the best advice I can give is to wait and see.

Jerry Schneider is an industry analyst and president of the Capital PC User Group. The views expressed are his own.



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To the Editor

MACINTOSH ZEALOTRY

I write with a comment on William F. Zachmann's column (On the Horizon) in the August 24/31 issue. The title, "The View From Planet Macintosh: Perhaps It's Time for Apple to Grow Up," says it all. It is, indeed, time for Apple and Apple Mac users to grow up.

While the Mac does quite a few admirable things (I'd gladly own one to play with if they were priced reasonably), you can get just as much done with a plain old PC clone. Here at a small college whose computer department has chosen the Mac as the machine for faculty and students, one is increasingly confronted with documents whose authors have put more time into tireless formatting than into the content of the text itself.

I am a member of a computer book club in whose advertising the following was found. I offer it as evidence that Zachmann speaks too soon: "Zen and the Art of the Macintosh by Michael Green. A unique account of one man's journey through the world of the Macintosh — a testament to the advanced graphics capabilities that can lead, he maintains, to 'computer enlightenment'."

Computer enlightenment for the rest of us? 'C'mon guys, it's just a tool!

Joseph T. Mallory
Assistant Professor of German
Hamilton College
Clinton, NY

I read with great interest Mr. Zachmann's column concerning, to use his words, "Zealotry." I have used the Macintosh since shortly after its introduction several years ago. I have also used and continue to use other types of personal computers, including MS-DOS machines. Due to my personal preferences and the various capabilities of these computers, I choose to use the Macintosh as the primary tool in performing my work. I would also classify myself as a Macintosh enthusiast as I use it for applications other than business. However, I do resent your implication that those of us who choose the Mac are some sort of fanatics.

Perhaps some of the derision that MS-DOS users feel directed toward them is due to the fact that the Mac was ridiculed as a toy with little or no utility in business applications. I remember being told by MS-DOS resellers that I needed to get a "real" computer before I could realize any gains in productivity.

Well now it seems the tables have turned. IBM has finally figured out that users want personal computers to do more than simply display rows and columns of numbers; they need high-quality graphics that can be translated to the printed page.

While I am positive that Apple is striving hard to gain greater corporate acceptance of its equipment, I am also

positive that Apple does not sincerely think it is going to reduce IBM and compatible technologies to a secondary status in the corporate market.

It has been my experience that Mac users are business users — not just hobbyists. They are not the hierarchical, miscellaneous functionaries that are so common in corporate America. They are the business people who are blazing trails and achieving innovations in their fields. Consequently, many of the faceless functionaries feel threatened by people who are more accomplished at function rather than form. Therefore, if the enthusiasm of Mac users withers your pinstripes, perhaps you should do something to improve your MS-DOS machines.

Daan B. Kellner
Real Estate Appraisal and Consultation
Lakewood, OH

The On the Horizon column of August 24 prompts me to respond. Although I am an Apple advocate, I also have 20 years' experience as a software developer, including considerable time spent in the Unix and MS-DOS worlds. I am one of many Mac developers struggling to create Mac-like programs under Microsoft Windows.

Mr. Zachmann's religious analogies interest me. I agree that Apple has overdone its evangelical preachings, but I also believe that the IBM PC-compatible world has its own right-worshippers. Did you ever stop to count the number of applications that the average business user of PC compatibility needs? Well? I am constantly amazed that so many people use so few applications simply because they are unwilling or afraid to learn new ones. Each PC program is so different and requires memorizing so many new key sequences that most users stick with what they know.

So what happens? These people become evangelists of a few programs, not because they are the best programs around, but because they're the ones they happen to know and the ones, therefore, that they think everyone else should know. They also become defensive of their machines. Asking them to try a Mac is like asking them to change churches.

So now we have IBM and Microsoft telling these users to switch religions and use the "soon to be released" Presentation Manager. But will this new religion be accepted in the IBM world? It's hard to tell. Can the PC user community be converted to a windows system? There's no reason to believe that it will be accepted any more than MS-Windows is today. Most users will be confused and will rush through the Presentation Manager to the comfortable world of their known applications. They probably will never use the Presentation Manager unless software developers force them to use it.

But why switch? Is it because the PC user is being told that the command line paradigm was a mistake? No, it's because IBM and Microsoft decided that the Maclike MS-Windows environment was a better environment for most users. But is it? Was Apple right all along? Maybe, but that's not the point. The missing element is that Apple chose that environment before any applications existed for the Mac and told developers how programs they wrote for the Mac should look and feel.

Apple had a distinct advantage in 1984. It provided a new machine and a new user interface at the same time. The developers started together and with Apple's guidance produced a cohesive set of applications for users. Apple's guidelines were so successful that the typical Mac user never opens the manual until he has tried out a new program. It would be interesting to see how many programs the average Mac user has in repertoire vs. the average PC user. I think you can guess the results. Mac users dare to try new programs because they're not afraid of a little incremental learning.

While the PC-compatible world spends its time trying to create a better environment for developers (OS/2), trying to compensate for the lack of contiguous address space (EMS 4.0), and trying to add a Maclike user interface (Presentation Manager), Apple software developers do what they're supposed to do. They write new applications for users. PC users will continue to suffer for many more years as misguided mistakes made in the choice of a segmented architecture and an operating system designed for hackers. PC developers would better spend their time developing a 68000 coprocessor to run Mac applications. By the time they have changed their religion and learned some new hymns, Apple will be too far ahead to catch.

Alan W. Hayes
Elot Software Co.
Elot, ME

CORRECTIONS

In a photograph of a Seybold graphics panel (September 14), we incorrectly identified one of the speakers. The panel at left in the photo is Derragh Muldoon of Cricket Software.

In the article "Atrium Unveils Micro Resource Manager LAN" (September 7), we listed incorrect prices. Prices begin at \$4,565. A three-user version costs \$5,695, and a 15-user version costs \$7,195.

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ELT 286-10B Plus

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ELT 286-10

\$1125

Base system, 80286 CPU, one wait state, 10 MHz, 512K on motherboard expandable to 1MB.

ELT 286-8

\$995

Base system, 80286 CPU, one wait state, 8 MHz, 512K on motherboard expandable to 1MB.

ELT XT-Turbo Systems

ELT XT-Turbo Plus

\$499

8088-1 CPU, zero wait state, 10 MHz, 640K on motherboard, 360K floppy, floppy controller, UL approved power supply, baby AT case and keyboard.

ELT XT-Turbo

\$459

8088-2 CPU, one wait state, 4.77/8 MHz, same configuration as ELT-XT Turbo Plus System.



ELT 286-10B Plus

ELT 286-10 Plus

ELT 286-12B Plus

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ST238 + RLL controller (30MB, 65 ms)	\$310
ST251 drive only (40MB, 40 ms)	\$425
ST4038 drive only (30MB, 39 ms)	\$495
Micropolis 40MB drive only (40MB, 28 ms)	\$659
Micropolis 72MB drive only (72MB, 28 ms)	\$919

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360K Fujitsu 5 1/4" floppy	\$79
360K Teac 5 1/4" floppy	\$89
1.2MB Teac 5 1/4" floppy	\$119
1.44MB Teac 3 1/2" floppy w/mounting kit	\$179
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Everex Modems

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Monographics card	\$59
Evergraphics Plus Deluxe (1024 x 350)	\$128
Color Card	\$70
EGA card w/Printer port (640 x 480)	Call

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AT EMS board expandable to 3MB, w/OK	\$139
XT Multifunction EMS w/OK, 1 parallel and serial port, clock and calendar, expandable to 1MB.	\$159
AT Multifunction EMS w/OK, 1 serial and parallel port, expandable to 1MB.	\$155
XT/AT I/O card	\$69

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XT 4.77/8 MHz, 2 layer, w/OK expandable to 640K	\$115
XT 4.77/8 MHz, 4 layer, w/OK expandable to 640K	\$135
AT 1 wait state, 6/10 MHz w/OK expandable to 1MB	\$370
ELT 286B, baby board, zero wait state 6/10 MHz expandable to 1MB	\$330
Baby 386, zero wait state, 16 MHz w/1MB expandable to 2MB	\$1500
Baby 386, zero wait state, 20 MHz, w/1MB expandable to 2MB	\$2035

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Samsung amber 12" amber	\$85
Samsung color	\$285
Nanao 8040 14" super CGA (800 x 410) + card	\$495
Nanao 8042 14" EGA	\$450
Casper 14" EGA	\$415
NEC Multisync (800 x 560, .31mm dot pitch)	\$570
Nanao 8060H PGA Multiscan (820 x 620, .31mm dot pitch)	\$540
Nanao 8060S PGA Multiscan (820 x 620, .28mm dot pitch)	\$575

Printers

Citizen 120D printer	\$195
Epson FX86 printer	\$415
Epson FX286 printer	\$555
Laser Printer	Call

Others

80387-16 (16 MHz)	\$565
80287-10 (10 MHz)	\$285
80287-8 (8 MHz)	\$235
MS DOS 3.21/GW Basic	\$85
PC DOS 3.3	\$139

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RAM 2000 PS w/OK expandable to 2MB	\$245
RAM 4000 PS w/OK expandable to 4MB	\$270
PS External 60MB cassette tape backup	\$935
PS External 60MB streaming tape backup	\$1185
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Apple EMAC compatibles

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Product Comparison

PRESENTATION GRAPHICS

BY RICK LONG, REVIEW BOARD



Graphics on the IBM PC were once a pretty straightforward issue. The PC, with its low-resolution CGA color monitor, wasn't much of a graphics engine. So graphics packages tended to specialize: There were charting packages that converted data into bar charts; enhancement programs that improved on Lotus 1-2-3's unimaginative graphics; and painting and drawing systems for artists who didn't mind working in crayon-level resolutions. But what were you supposed to do with your pie chart once you'd perked it up with cyan and magenta? Carry the monitor into the boardroom?

EGA changed a lot of that. So did faster computers, which were finally able to draw something on the screen within your lifetime. Desktop publishing and other programs capable of integrating graphics have also boosted interest in sophisticated graphics programs. Output devices have grown in power while dropping in price.

So now presentation graphics is a market exploding with choices, but — unlike other software categories — the field has no clear market leader to offer conservative customers the safe buy. There are more product types than ever before, and they are being combined in various ways into integrated graphics programs.

At the moment — and don't hold us to this six months from now — there are five presentation graphics tools you'll find most commonly available:

Charting programs turn data into charts. They can usually import data from spreadsheet files or allow you to type in the numbers; they then generate any of a variety of charts, plots, and graphs. They emphasize their ability to handle large numbers of data points, and they provide many chart types; some include calculation capabilities. A popular feature is the capability to produce word charts, or slides that consist entirely of words.

Enhancement programs take a pre-existing graphic — such as a 1-2-3 graphic file — and let you enhance it with greater control over colors, finer resolutions, and often clip-art symbols libraries. A recent development is the memory-resident screen capture utility that lets you enhance a screen from virtually any program. Also new (and dazzling) are three-dimensional graphics.

Paint packages offer freehand painting; they are bit-mapped, which means they give you control over every pixel on the screen. The result is beautiful color, though output resolution is limited by the capabilities of the screen and graphics card in your system.

Draw programs, by contrast, use vectors, or mathematical descriptions, to draw lines on the screen. Vector graphics don't always look that good on screen — text is often unreadable — but they are not tied to the resolution of your computer screen; they can produce spectacular output to the limits of your printing device. The trade-off here between on-screen dazzle and off-screen quality is clear. But paint programs are usually able to export to desktop publishing programs, while few stand-alone drawing programs are compatible in this way.

Slide show programs combine enhancement or paint packages with a command module that lets you display a limited series of graphics screens to produce a self-running or user-interactive slide show program. Some slide show programs offer impressive Hollywood-style special effects, including wipes and dissolves and even crude animation.

These five approaches to presentation graphics are, to an increasing extent, combined in various ways. Traditional charting programs are adding enhancement features by the yard, for example, while enhancement packages are adding slide show capabilities. The logical extreme is a program like VCN Concorde, which — at \$695 — offers every feature you can think of.

Then there are the more exotic graphics product categories that have sprung up recently: mapping packages; engineering design tools (CAD/CAM); profes-

sional graphics design tools (Adobe Illustrator); straight animation packages; statistical charting packages; and the graphics modules of integrated programs such as Framework, the newly announced Microsoft Works for the PC, or — after all these years, still the best-selling graphics package of all — even Lotus 1-2-3.

Even as we speak, developers are eyeing the colors and increased resolution of the new VGA standard and dreaming up new categories. One product that shows where they're going is Zenographics' Mirage. It supports a palette of 96 colors, can handle mainframe data, and produces extremely high-quality output. Mirage's \$395 price tag is only a fraction of the total investment you'll need in hardware to make full use of this product.

To produce this Product Comparison, InfoWorld screened more than 80 graphics packages and selected six business-oriented packages for a detailed examination. These six, none of which have previously been reviewed in our pages, present a nice cross section of the graphics market in its current state of flux, running the gamut from easy and inexpensive to feature-laden and powerful. We tested all on an IBM PC XT with 640K, a hard disk, and EGA, and then we tested them again on an AT. We used no math coprocessor, though we recommend one for serious work. Graphics programs consume hardware: The more power you have, the happier you'll be. Even small hardware enhancements result in noticeable performance improvements.

All the products were judged through the same test. A DIF data file was imported (only one package was unable to accept DIF); bar charts and pie charts were created; and titles, legends, and other enhancements were added. The resulting output was displayed on the screen and then sent to a plotter.

In this product comparison we also list presentation graphics programs we've recently reviewed, along with their scores, and we provide a list of other graphics packages you might want to consider. We've added a sidebar on output considerations — what you do with the output short of lugging the monitor into the boardroom. Finally, the InfoWorld Executive Summary draws the bottom line: Which presentation graphics packages are most suitable for which purposes?

Harvard Graphics

Positively the best in show among these products is Harvard Graphics. Software Publishing's major upgrade of its Harvard Presentation Graphics program (see First Look, August 3, and review of earlier system, May 26, 1986). Harvard's list of pluses is so long that you hardly notice its limited number of drawbacks. It integrates charting and drawing functions more completely than any of the products reviewed.

You'll be quite impressed with its list of chart types. This includes all the standards, of course, but it also includes many others, such as histograms, semi-log and log-log charts, paired bar charts, and proportional and linked pie charts. The drawing board lets you create organizational and flow charts, diagrams, and free-form

drawings. Unlike most other products, Harvard allows a chart to be enhanced with symbols or diagrams in the drawing board.

In addition to importing symbols created in the drawing board, you have 100 stock shapes and drawings available to you in the symbols library. You can use these in any chart, graph, or diagram. If you need even more types of symbols, the program will accept any imported bit-mapped picture file. And you can build on the seven basic fonts, enhancing them to provide a library of 22 different type styles.

After creating a series of charts and diagrams for a presentation, you can organize them into a rather sophisticated screen show. You can use bit-mapped files created with other programs, such as PC Paintbrush, PC Paint, or Dr. Halo. Not only do you put your slides in a particular order, you also cue your show for both timing and visual effects. You can make one slide dissolve into another. You can build on an idea or concept by overlaying one chart on another. Finally, you can even make cue cards for your verbal presentation that are linked to a specific graph, diagram, or chart. Once the program is complete, you store the whole thing under a unique name to be recalled and run on demand.

There are many occasions when the same presentation can be used — with only slight modifications — for different situations or sales prospects. Harvard Graphics has a unique feature for the creation of templates which permit you to predefine the defaults of frequently used chart styles.

This is the only product we tested that can perform intensive mathematical calculations. Using command keywords similar to the "B" formulas in Lotus 1-2-3, you can expand or modify your input data to create different charts. For example, the notation "@MAVG" creates a data series which is the moving average of another data series in the chart. Use "@REXP" and you've computed an exponential regression curve for the series. Similar commands exist for linear, logarithmic, and power regression. You can also use the command keywords to copy or move data between series, as well as to compute cumulative or net values between series of data.

Strangely, Harvard Graphics will not import a DIF file. It will import a Lotus 1-2-3 worksheet or graph, an ASCII file, or a PFS Graph file. It will export in a Metafile format, so it is useful in desktop publishing applications.

The program appears through a series of drop-down menus. Even these have a sharp, well-conceived, and impressive look. A command line at the bottom of the screen lists function key calls for Help, Size, Attributes, and Drawing. This command line is available at all menu levels, so you can look at your graph after every change or edit by pressing F2.

The most amazing thing about Harvard Graphics is its price. Costing only \$395, it's less expensive than many of its less capable competitors. In our opinion it's the best performer of the group and a great value.

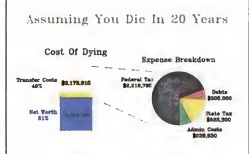
Harvard Graphics, Version 2.0: list price, \$395. Software Publishing Corp., 1901 Landings Drive, P.O. Box 7210, Mountain View, CA 94039; (415) 962-8910.

Energraphics

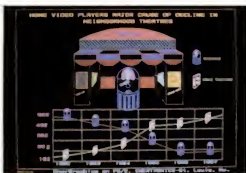
This product was probably the first real integrated graphics product to appear on the PC. By "integrated," we mean that it combines the elements of chartmaking with those of text graphics, and also provides drawing and symbolic diagrams. Many of the other entries in the race have had an opportunity to go to school on Energraphics' early success.

Even though it's been around for a while, Energraphics is still a fine product. It is easy to install and above all easy to use. It uses a segmented screen to display menus, communication messages, and display data. Pop-up windows display help screens. Function keys activate all menu selections.

You can almost get along without the documenta-



Harvard Graphics produces histograms, semi-log, and log-log charts as well as the bar and pie charts pictured.



With the charting subprogram of Energraphics, the user can enhance a chart with up to 100 symbols and icons.

tion for simple charting in this program. Customizing charts and drawing requires a little study and reading. Energraphics' documentation is very thorough in what it covers, but it is neither well-written nor well-presented.

As a charting program alone, Energraphics is slightly above average. It may not have the extensive list of graph types that some of the other packages offer, but it has all the essential chart types. These include some special features such as three-dimensional perspective, logarithmic scaling, and regression. In addition to your typical line, bar, and pie charts, you can do scatter charts, Hi/Low/Close, Gantt, text charts, and polynomial regressions.

Energraphics also includes a screen show feature that is ideal for desktop presentations. A chart completed in the charting subprogram can be enhanced with up to 100 symbols and icons, but it can't be moved to the drawing board and enhanced with free-form drawing. The drawing section of the program includes 19 templates with 26 symbols on each template.

Energraphics has an awkward file import procedure.

A DIF file must be imported and then converted to a special Energraphics format before it can be used in a graph. (The vendor sells a \$49 macro utility for abbreviating the import procedure for Lotus files.) One plus is that several distinct charts can be created from a single DIF file. This feature makes the program a lot more flexible than programs that require you to remember the structure of the file before leaving 1-2-3.

Unfortunately, Energraphics is also a little slower than most of the other programs, but the difference is not significant, and if you didn't have a bunch of other programs to compare it to (as we did), you might not even notice the slower speed.

When installed, neither our mouse nor our plotter functioned correctly. But more importantly, a call to their 800 number (the only 800 number available among all these products) resulted in a quick solution to both problems.

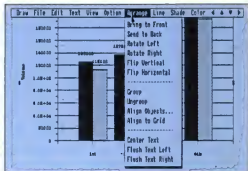
Energraphics is the most expensive of all the products we evaluated. In terms of features and performance, it's a fine product, but it's only a fair value at \$595.

Energraphics, Version 2.01; list price, \$595. Enertronics Research Corp., 5 Station Plaza, 1910 Pine St., St. Louis, MO 63103; (800) 325-0174.

VP Graphics

This product bears a striking resemblance to Windows Graph, with pull-down menus and a drawing tablet. It doesn't really use Windows—it just looks like it does. VP Graphics is a drawing-oriented product with charting capability. You can draw lines, arcs, and polygons. You can also mix in text. There is a limited symbols library (containing 32 symbols), which can be used to enhance the graphs and text charts.

Although you can work from the keyboard, this type of product is intended for a mouse. Familiarity with Microsoft Windows will make learning this program quite easy, because of the similarity, but it's not absolutely necessary.



With a few clicks of the mouse, VP Graphics can enhance a graph by placing a drop-shadow effect behind.

As graphics packages go, VP's features are fairly basic. They are limited to conventional line, bar, stacked bar, x-y, and pie charts. You can explode a pie slice; and, using the shading menu, you can turn a line chart into an area chart. Logarithmic scaling and double y-axis charts are beyond its abilities. Some fairly interesting results can be achieved by combining symbols, text, and charting on the same page.

As with all the windows-type products, you can create multiple pages of copy within the same file. This approach lends itself well to the development of entire presentations and batch processing of completed programs.

Installing device drivers is simple the first time around. (You can't run the program until the drivers are installed.) But changing them is another story. It can't be done from within the program. This is a problem with print devices in particular.

To begin with, we installed an HP Laserjet. Later, when we wanted to change to an HP Plotter Series II, we had to reinstall the printer drivers. The documentation recommends a separate installation file for each

How Do You Print It?

Deciding what features you need is only half the battle of choosing a graphics program. The type and quality of output is of equal importance. There are several ways to produce output from a graphics program, including hard copy, slides, photographic prints, and on-screen video. It won't do you any good to generate exotic bubble graphs if you can't print them on your new 300-dpi laser printer.

Your selection process is fairly easy if your requirements are simply for hard copy printouts and transparencies. You need only make sure the product supports your dot-matrix printer, plotter, or laser printer (a daisy wheel will rarely be of use here). Choosing the right output device is a little harder. Dot-matrix printers are inexpensive and can produce surprisingly good black-and-white paper graphs. Color is available on dot-matrix or ink-jet printers. (Make sure the graphics package supports your machine.)

A special word about laser printers is in order. Laser printers don't support color yet, but they provide both high-quality output and the capability of mimicking dot-matrix printers. However, not all graphics products support these devices. Most only support a limited number of the best known brands. If you've already purchased your laser printer and it doesn't at least emulate the Hewlett-Packard Laserjet, it becomes doubly important that the graphics program you're considering support your specific printer brand and model. Note also that laser printers with minimal memory won't produce graphics, or will be very restricted in the amount of graphics they can handle. You need at least a megabyte of RAM to get a full page of high-resolution (300-dpi) graphics. Finally, you will probably have to purchase some form of downloadable fonts to get the best results out of the machine in addition to the graphics capability. You may find yourself paying more than just the street price of a bare-bones machine to get the most from your laser printer.

However, if your need is to enhance your desktop publishing operation, laser drivers are less important than the capability of converting the graphics files into a form useful to desktop publishing programs.

Three favored methods are TIFF (Tag Image File Format), compatible with Pagemaker and Microsoft Windows, and Publishers Paintbrush and Dr. Halo. Two paint programs whose file formats are widely used as common ground by other graphics programs and which are compatible with both Pagemaker and Ventura Publisher.

Plotters—another popular type of graphics output device—are slow, but without a doubt they give you the best hard copy color graphics output available. A plotter is also a necessity for producing color transparencies. Almost all graphics products support the most popular plotters. Be careful, however, if your plotter is over 5 years old (graphics programs may not have drivers for it) or if it is a specialized device used in CAD work (which might make it too exotic for most graphics products). Plotters can handle only eight colors (pens) at a time, so the number of colors your graphics program can generate beyond this number means little with this output form.

Not so with slides and photographic prints from image recorders. These can handle as much color and resolution as your monitor can deliver. With this type of device, the graphic image is reproduced on photographic film rather than in hard copy form. The quality of the result depends primarily on the image recorder that is used, and in some cases upon the type of graphics adapter being used.

The most widely supported image recorder is the Polaroid Palette. It also represents the low end of the spectrum in terms of both price (about \$1,200) and quality. At a resolution of 640 by 400 dpi, Polaroid's product is as good as the screen display of an EGA monitor. This may be sufficient for many users, but some will notice that the lines and curves are not quite crisp, or that finely drawn symbols have a slightly fuzzy look around the edges.

The only way to improve the quality is to use a better image recorder. A number of choices are available with resolutions ranging from 1,800 by 1,300 dpi to 10,000 by 10,000 dpi. Such quantum leaps in resolution are accompanied by quantum leaps in price: Some cost well over \$20,000. If you're in the market for this kind of power, make sure your

graphics product supports that kind of resolution—generally you're looking for vector-based rather than bit-mapped graphics programs because vector output can adjust automatically and without limit to the resolution of the output device. Bit-mapped graphics, on the other hand, look better on-screen (so they are ideal for slide-show products), but the output to hard copy of recorders is limited by the resolution of the graphics card and monitor.

There are several products that produce film and slide reproduction through regional service centers. Autographix 35 (Autographix Inc., Waltham, MA) is typical: You create and they produce. Finished files are transmitted by modem to the service center, where a high-quality image recorder produces the slide or photo. That's one way to get your high-end image recorder without paying the price. At \$10 per 35mm slide, it can be well worth your while for some projects. Compufilm, by Koala Technologies (Scotts Valley, CA) offers a slight variation: You store up to 10 images on a special floppy disk, then send it in its prepaid Federal Express mailer (included) to the processing plant, getting back 35mm slides within 48 hours for a net cost of \$15 per slide, shipping included.

Screen presentations or video shows are relatively new features of many graphics products. Using the screen show, slide images are recorded in files along with a command file that handles such special effects as overlay and dissolve and timing of displays. The finished product might involve dozens of individual images and is displayed on the computer's screen or on a projection TV. Resolution is limited by that of the display adapter used and will not, therefore, be as good as that of the better image recorders. But quick production and flexibility can pay dividends. For example, you can prepare a program this morning and show the finished product this afternoon.

Some screen presentation programs that offer better resolution are hardware dependent. This is true, for example, with General Parametric's Video Show and the recently introduced PC Emcee from Decision Resources, which require their own video display systems.

—Rick Long



Windows Graph outputs enhancements such as exploded pie sections, overlapping bars, and logarithmic scale.

desired configuration. It would be much easier to provide multiple output device files that could be accessed from the program.

The product uses the key-disk type of copy protection. (Registered users can purchase a non-copy-protected version for \$10.) Even when installed on a hard disk, the main program disk must be kept in drive A. No hard disk installation procedure exists to eliminate this nuisance. We can say very little for support since the time was busy every time we tried to call. Paperback Software has a policy of paid support only, no free support.

VP Graphics does have a number of nice features. It imports data from a DIF file more readily than any of the other programs. Simplicity is the key. Whatever was saved in the file gets displayed in the worksheet window. Then you define the ranges with which you wish to work.

This method is much easier to handle than the system used in several other products, where the data ranges must be specified before you run the import program.

Although it doesn't have three-dimensional capability, VP Graphics can enhance a graph by placing a drop-shadow effect behind the graph. To achieve the drop-shadow effect, you copy the graph in a position slightly below from the original, change the color to solid black, and move it to the back of the original. As complicated as it might seem, this procedure takes only a few keystrokes or clicks of the mouse.

One of VP Graphics' strongest features is the clarity of its documentation. The documentation is obviously

intended for the novice user.

For those wishing to get into integrated presentation graphics — both charting and drawing — with limited expense and an easy learning curve, VP Graphics, at \$99.95, is an excellent value.

VP Graphics, Version 1.0; list price, \$99.95. Paperback Software International, 2830 Ninth St., Berkeley, CA 94710; (415) 644-2116.

Windows Graph

Although there are strong similarities between Windows Graph and VP Graphics in terms of appearance and operation, they are far from identical. The features in Windows Graph are designed for constructing business graphs. Thus, its capabilities are quite extensive. (See First Look, July 13.)

Windows Graph has a limited number of primitives, but to really combine drawing and symbols with charts, you must also purchase Windows Draw (reviewed May 5, 1986). The two products are a formidable combination.

On its own, Windows Graph has a very comprehensive list of charting features. These include bar, column, area, line, pie, and scatter charts, as well as tables. Enhancements such as exploded pie sections, three-dimensional perspective, overlapping bars, logarithmic scale, and double y-axis are well within the program's limitations.

The Windows Graph program has the advantage of being capable of importing data easily from several different file protocols, including DIF and WKS. Several printers and plotters can be installed and changed on the fly.

But Windows Graph is not devoid of problems. When running our test files, we encountered problems labeling the axis. We found no pre-positioned labels, so placing titles and axis labels was very difficult. They must be individually positioned, centered, and combined with the rest of the chart. A window for text labels would be very helpful. Presenting the data is easy. Cleaning up and finishing the graph is a pain.

Windows Graph costs \$395 — rather pricey considering that it's mainly a charting package. When combined with Windows Draw (\$199) and the Clip Art collection (a symbols library that costs \$99), the package is very complete and powerful, but one with a price tag of almost \$700.

Windows Graph, Version 1.0; list price, \$395. Micrografix, 1820 N. Greenville Ave., Richardson, TX 75081; (214) 234-1769.



With Picture Perfect, you must select the type of graph you intend to create before you do anything else.

Picture Perfect

This product, like Windows Graph, is limited to business charts. It has the shortest list of charting features of any of the products we reviewed. It shares some things with its sister product Diagram/2000 (a \$395 symbols library, reviewed July 20). But while Diagram impressed us as a powerful and effective product, Picture Perfect is a disappointment, both on its own merits and in comparison with others.

In all but a few cases, Picture Perfect's features list may be short, but it is certainly adequate for the task. It does both horizontal and vertical bar charts in stacked, clustered, or overlapping formats. Picture Perfect will do line or area charts as well as combination bar and line charts. It has the capacity to use double y-axis orientation. Provided you purchase and install them, Picture Perfect can use all 43 type fonts available for Diagram. It will even show plotted data in chart form below data points.

The program is missing some features common to its competitors. For example, it will not plot logarithmic scales. It will not compute and display regression lines. There is no three-dimensional perspective available. It does not create high/low/close or 100 percent bar charts. It does not create Gantt, bubble, or paired bar charts. You cannot link pie charts or have them displayed in a proportional mode.

The current release (4.0) has made significant strides in improving printer/plotter/palette support. More than 60 output devices are now supported — a comprehensive list by anyone's standards. Picture

Recently Reviewed:

Presentation graphics packages recently reviewed by InfoWorld include:

Diagram: A charting and drawing package that includes a symbol library. List price: \$395. Computer Support Corp., 2215 Midway Road, Carrollton, TX 75006; (214) 661-8960. Version 3.5 (current version) reviewed July 20. Overall score: 6.2.

Freelance Plus: A charting and drawing package. List price: \$495. Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 577-8500. Reviewed January 19, 1987. Overall score: 7.0.

GEM Desktop Collection: Includes GEM Word Chart, GEM Draw, and GEM Graph. List price (GEM Presentation Table): \$495. Digital Research Inc., 60 Garden Court, P.O. Box DRI, Monterey, CA 93942; (408) 649-3896. Version 1.2 reviewed October 6, 1986. (Current version is 2.2.) Overall score: 6.7.

Graph-in-the-Box: A memory-resident instant graphing package. List price: \$99.95. New England Graphics Inc., Greenwich Office Park #3, Greenwich, CT 06831; (800) 633-2252; (203) 625-0062. Version 1.1 reviewed June 30, 1986. Overall score: 3.4.

HP Graphics Gallery: An integrated charting and drawing program. We reviewed Version 1.00 April 13; HP has just announced Version 2.0, a major enhancement. List price: \$695 (Gallery Collection, includes Drawing Gallery, Charting Gallery). Hewlett-Packard Business Computing Systems, 19091 Pruneyard Ave., Cupertino, CA 95014; (408)

447-1664. Overall score for Version 1.00: 6.4.

Inset: A screen capture program that inserts captured graphics into other applications. List price: \$99. Inset Systems Inc. (formerly America's Programmers Guild), 12 Mill Plain Road, Danbury, CT 06811; (203) 794-0396. Version 1.1B reviewed May 26, 1986. (Current version is 2.1.) Overall score: 4.2.

Microsoft Chart: A charting package. We reviewed Version 2.0 March 31, 1986; Microsoft has announced a major upgrade to Version 3.0. List price: \$295. Microsoft Corp., 16011 N.E. 36th Way, Redmond, WA 98073; (206) 882-8080. Overall score for Version 2.0: 7.4.

Perspectives: A three-dimensional graphics package; now being sold as Bacing Graph. Version 2.0a. List price: \$350. Boeing Computer Services, P.O. Box 24346, Mail Stop 7JW-05, Seattle, WA 98124; (206) 644-6195. Reviewed as Perspective 1.1, November 24, 1986. Overall score: 6.8.

Show Partner: Specializes in slide shows. List price: \$79. Brightbill-Roberts and Co. Ltd., 120 E. Washington St., Suite 421, Syracuse, NY 13202; (315) 474-3400. Version 2.0 reviewed January 26, (Current version is 2.2.) Overall score: 7.5.

Slidewrite Plus: Emphasizes 35mm output capabilities. We reviewed Version 1.20 June 22; newly announced is Version 2.0, with significant enhancements. List price: \$345. Advanced Graphics Software Inc., 333 W. Maude Ave., Suite 105, Sunnyvale, CA

94066; (408) 749-8620. (Also sold by IBM as IBM Slidewrite.) Overall score for Version 1.20: 5.9.

Stella Business Graphics: An amazingly quick and easy-to-use package with high-resolution output. List price: \$99 (reduced from \$199). Vendor has announced high-end version, Business Graphics II, \$195. Stella Systems Inc., 10430 S. De Anza Blvd., Suite 185, Cupertino, CA 95014; (408) 257-6644. Version 3.0 reviewed March 16. Overall score: 7.8.

3D-Graphics: A Lotus add-in that enhances 1-2-3 charts with three dimensions. List price: \$79. Intex Solutions Inc., 568 Washington St., Wellesley, MA 02181; (617) 239-1168. Version 1.0 reviewed August 3. Overall score: 8.4.

VCI Converter: An integrated graphics program. List price: \$695. Visual Communications Network Inc., 238 Main St., Cambridge, MA 02142; (617) 497-4000. Version 1.0 reviewed August 18, 1986. (Current version is 2.0.) Overall score: 6.9.

Windows Draw: A companion product to Windows Graph; runs under Microsoft Windows. List price: \$199. Micrografix Inc., 1820 N. Greenville Ave., Richardson, TX 75081; (800) 272-3729; in TX call (214) 234-1769. Version 1.0 reviewed May 5, 1986. (Current version is 1.04.) Overall score: 6.2.

See also the following InfoWorld Product Comparisons: **PC Paint Programs**, June 22; **Slide Show Programs**, March 23; and **Buyer's Guide to Presentation Graphics Programs**, also March 23.

"and More Graphics Programs . . ."

The world of graphics software is rich with choices. Here is just a sampling of additional packages.

Autumn, Version 5.1. Zenographics, 19752 MacArthur Blvd., Suite 250, Irvine, CA 92715; (714) 851-6352. Price: \$595. *Chartbook graphics with full drawing and editing. Subset of Mirage (see below).*

Boeing Graph (formerly Perspective). Boeing Computer Services, Micro Software Products, P.O. Box 24346, M.S. 7W-05, Seattle, WA 98124; (800) 368-4555. Price: \$395. *Graph and chart program that includes link to Boeing Calc. Version 4.0 newly released.*

Chart Master, Sign Master, Diagram Master. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502; (213) 329-8000. Price: \$375. *Trio of graphics packages.*

Chartman II (formerly Chartstar from Micropro). Mosaic Software, 1972 Massachusetts Ave., Cambridge, MA 02140; (800) 422-8946. Price: \$99. *General-purpose graphics package.*

Executive Picture Show. Spectrum Holobyte, 2061 Challenger Drive, Alameda, CA 94501; (415) 522-3584. Price: \$245. *Graph and draw program including slide and animation capabilities.*

Freeform. Artch Software, P.O. Box 2847, Reston, VA 22090; (703) 860-3085. Price: \$149.95. *Easy business graphics package with icon-driven user interface, three-dimensional graphics, and text.*

Graphix Partner. Brightbill-Roberts and Co. Ltd., 120 E. Washington St., Suite 421, Syracuse, NY 13202; (315) 474-3400. Price: \$89. *Graphics processor that can work alone or as an add-on to Lotus 1-2-3.*

Graph Station. Software Clearing House Inc., 771 Neeb Road, Cincinnati, OH 45238; (513) 451-6742. Price: \$495. *Business graphics program with powerful Lotus interface.*

Key Chart Graphics System, Version 4.0. Softkey Software Products, 260 Richmond St. W., Suite 300, Toronto, Ontario, M5V 1W5; (800) 263-5800. Price: \$149 (printer version). *Entry-level business charting and graphing product.*

Kinetic Graphics System. Kinetic Presentations Inc., Distillery Commons 260, Louisville, KY 40206; (502) 583-1679. Price: \$995. *Five modules: System, Words, Graphs, Layout, and Art.*

Mass-11 Draw. Microsystems Engineering Corp., 2400 W. Hassell Road, Suite 400, Hoffman Estates, IL 60195; (312) 882-8790. Price: \$495. *Graph and drawing product with complete set of icons for image creation.*

Mirage. Zenographics, 19752 MacArthur Blvd., Suite 250, Irvine, CA 92715; (714) 851-6352. Price: \$895. *Oriented to professional graphics houses, or graphics arts departments of large corporations. Has very high quality output for 35mm slides.*

PC-Key-Draw. Oedware, P.O. Box 595, Columbia, MD 21045; (301) 997-9333. Price: Trial, \$15; Registered, \$100. *Shareware presentation graphics product with painting and CAD features.*

PC Paintbrush Plus. Zsoft Corp., 1950 Spectrum Circle, Suite A-495 (after October 15: 450 Franklin Road, Suite 100), Marietta, GA 30067; (404) 980-1950. Price: \$149. *Drawing and painting program with support for image retrieval and laser printers.*

Presenter PC. Dicomedia Corp., 12000 Portland Ave. S., P.O. Box 246, Minneapolis, MN 55440; (612) 885-3000. Price: \$995. *Drawing-oriented, does conventional and text charts from data. Uses the Videoshow interface.*

Rhase Graphics. (Being replaced by DB Graphics at same price.) Micromin, 3925 159th Ave. N.E., Redmond, WA 98073; (206) 885-2000. Price: \$295. *Business graphics package with special features for Rhase data. New version supports Rhase and other data.*

Sanna Dedition Graphics. Sanna Corp., 2700 N.E. Expressway, Atlanta, GA 30345; (800) 831-9679. Price: \$450. *Presentation graphics package. Includes three-dimensional features, calculation, and link to Sanna word processor.*

Slide Expert. Autographix Inc., P.O. Box 9031, Waltham, MA 02254; (617) 890-8558. Price: \$249. *Chart and graph product with communications software for sending information to slide-inaging house.*

Sound Presentations. Communications Dynamics Inc., 7300 S.W. Hunziker, Suite 200, Tigard, OR 97223; (503) 684-5151. Price: \$300. *Easy-to-use charting and graphics program including 35mm slide creation in its features.*

Story Board Plus. IBM Corp., (800) 426-2468. Price: \$350. *Graphics package designed to be an easy application to use.*

Telepoint. LCS/Telegraphics, 222 Third St., Suite 2242, Cambridge, MA 02142; (617) 547-4738. Price: \$69. *Painting and charting package.*

Perfect's support of graphics adapters and monitors is equally complete. Even on an RGB monitor, display of graphs is very good.

The documentation serves both as an installation guide, which is easy to use, and as a tutorial, which requires several worthwhile hours to complete. Help screens serve as a technical reference on all the program's features and capabilities. These are well-displayed and in all but a few instances are very helpful indeed.

The problem with Picture Perfect, then, is not so much what it does but how it does it. You must select the type of graph you intend to create before you do anything else. Then you input data, titles, legends, labels, and so forth. If you're not entirely satisfied with what you see, it is no simple matter to redisplay the data in another form. All the other products we've seen allow switching from one type of graph to another with one or two keystrokes. Picture Perfect first forces you to save the graph in its current form. Then you exit the chart program and return to the main menu of chart choices. After selecting your next graph type, you must reload the previous graph.

Picture Perfect does not function with any desktop publishing system. Neither will it directly interface with Diagram, which would enable you to enhance charts with symbols or icons.

This product sells for \$295. Buy both Picture Perfect and Diagram for \$590. The latter is a good value. We

wish we could say the same for the former.

Picture Perfect, Version 4.0; list price, \$295. Computer Support Corp., 2215 Midway Road, Carrollton, TX 75006; (214) 661-8960.

Graphwriter

A major upgrade of Lotus Graphwriter is being announced as this report goes to press. This is good, because Graphwriter in its current form is simply not up to the standards of the other packages in this comparison — nor to the high standards set by its companion product, Lotus Freelance Plus. (See full review, January 19.)

The current version of Graphwriter does have a very wide range of choices in graph types, close to Energraphics and Harvard Graphics for top honors in this department. It lacks the screen show, three-dimensional display, and symbolic diagram features available in Harvard and Energraphics, but it is the only product reviewed in this comparison that creates bubble charts. Much to its credit, the program comes with quick-start instructions for both installation and chartmaking.

But, while this version of Graphwriter excels in

breadth of features, it is a disappointment in performance, ease of use, and documentation. A prime candidate for reform in the coming update is the input format, which in this version is more difficult to use than the other products we've considered here. Lotus uses a combination of menus and a continuous question and answer technique, which cannot be halted or recycled until all required information has been entered. Importing data from a DIF file is also a chore. You must describe how many rows and columns, where to start, and how to read the data.

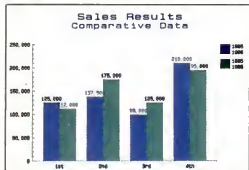
Charting worksheets, included with the documentation, are an absolute necessity for designing your charts in detail before setting them up in the program.

The documentation is very detailed, highly technical, but difficult to read. And the tutorial is not extensive. Help screens can only be described as cryptic.

Finally, we found Graphwriter's screen preview capability the weakest of those here.

In conclusion, we recommend you take a close look at the update, and if you find it meets your needs, make sure you don't accidentally buy the earlier version.

Graphwriter, Version 4.3; list price, \$495. Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 577-8500.



Graphwriter produces a wide range of graph types, and is the only product reviewed that produces bubble charts.

Executive Summary

Some graphics packages emphasize low cost and ease of use. Others emphasize the completeness of their range of features.

For the occasional user, VP Graphics is a fine choice. Inexpensive and very easy to use on a casual basis, it still offers a fairly complete range of features.

If you plan to make heavy use of graphics, say in a business or department with frequent need for graphics for reports, fliers, newsletters, or presentations needing charts, drawings, symbols, and graphs, your needs are more sophisticated. Energraphics can be a good choice if the graphics work is stand-alone; that is, if the data for the graphs or the completed graph files do not need to be integrated with other programs. It offers both text graphics and charting capabilities.

But Harvard Graphics is the way to go if you need a good range of graphics capabilities and you want to integrate the results with desktop publishing or other graphics output. Harvard gives top-quality output, compatibility with other programs, and pretty slick slide-show capabilities to boot. It's overall the strongest package considered here, and at \$395 it's pretty reasonably priced for its power.

Finally, there are special situations. If you need symbols, symbols, and more symbols, Diagram has the largest symbols library we've seen, which might make its companion product, Picture Perfect, worth considering. Another specialty combination is Windows Graph and Windows Draw, the only ones considered here that offer a Microsoft Windows environment.

OUR NEW GRAPHICS SOFTWARE FOR dBASE AND R:BASE MAY BE A BIT FASTER THAN YOU'RE USED TO.

Up until now, turning the raw data of a dBASE III/III PLUS or R:BASE file into easily understood graphs and charts has been anything but quick.

It's meant plodding back and forth between your database and your graphics program, through file conversions and translations, until you finally got a chart that made your point.

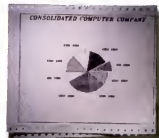
But now there's a faster route to arresting presentation graphics. Now there's DB Graphics.

Rank	Sales	Profit	Assets	Liabilities	Equity	Debt	Equity	Debt	Equity	Debt	Equity
1	1000	100	1000	1000	1000	1000	1000	1000	1000	1000	1000
2	800	80	800	800	800	800	800	800	800	800	800
3	600	60	600	600	600	600	600	600	600	600	600
4	400	40	400	400	400	400	400	400	400	400	400
5	200	20	200	200	200	200	200	200	200	200	200

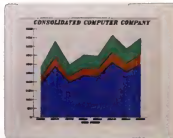
DB Graphics turns raw dBASE III/III PLUS and R:BASE data files into graphics with no conversion, export or import.

THE FIRST GRAPHICS SOFTWARE THAT GOES STRAIGHT TO THE HEART OF YOUR DATABASE.

DB Graphics is the only presentation graphics software designed specifically for dBASE, R:BASE and other database software users.



You can change the style of a graphic, or the data it represents in an instant.



Powerful database management tools make it easy to get the data you need into a graph.

Since it reads dBASE and R:BASE databases directly, there are no time-consuming export, import or conversion utilities to fool with. DB Graphics can also sort and group fields and use conditional operators and other powerful database management tools to precisely select and graphically display the data you need.

And because it has a direct line to your live data, you can modify a graph, or choose different data to represent, in an instant.

MAKE A GRAPHIC IMPROVEMENT IN ALL YOUR PRESENTATIONS.

Even though DB Graphics is more intelligent than other graphics programs, it's no less attractive. It allows you to display your data in eight different graph types—pie, bar, high/low,

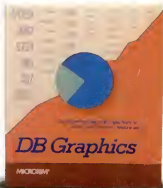
scatter, area, mixed, column and line. You can work with 16 colors and hundreds of vivid combinations of textures and patterns. Plus, you can choose from seven type styles for free text and labels.

In fact, there's really only one kind of database presentation DB Graphics isn't capable of making. A dull one.

FOR A TRIAL PACK, CALL 1-800-624-0810 DEPT. IW0922.

We could go on about the power, speed and accuracy of DB Graphics, but you really need to experience it for yourself.

So call our toll-free number (or from Alaska or Canada call 1-206-867-1800 Dept. IW0922) and order a DB Graphics Trial Pack for just \$9.95 today. And start making the most out of your database.



The only presentation graphics software specifically designed for dBASE, R:BASE and other database software users.

DB Graphics also works with Lotus 1-2-3, Symphony, Multiplan and other data management files after translating to the ASCII, dBASE III/III PLUS or R:BASE format. DB Graphics is compatible with the IBM PS/2, PC, XT, AT and 100% compatible personal computers. It supports the IBM VGA, MCGA, EGA, CGA and Hercules display standards. It also supports most popular printers, graphic printers, camera systems and laser printers from IBM, Epson, Hewlett-Packard and many others. © 1987 Microsin.

New Lower 386 Prices

DeAR READER:
i AM LOSING
MONEY ON
EVERY 386
i SELL, so i HAVE TO SELL A
BUNCH TO MAKE UP FOR IT.

ALSO, THE CONTEST TO PIK ME
A NEW SUIT IS OVER. WATCH FOR
MY NEW DUDS IN THE NEXT AD.

—YOUR BUDDY
AMT Jr.

AMT Jr. has his thinking cap on.

We're lucky to have a smart kid like him handling our marketing strategy.

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Software Reviews

Although Q&A Write doesn't do everything the big, hairy word processors do, it has plenty of power for the average user and a number of nice little tricks that even the big guys don't have.

REVIEWS SCORING

InfoWorld reviews only finished, production versions of products, never beta test versions.

All products receive scores ranging from unacceptable to excellent in various categories. We then weight the scores in different categories (giving the most weight to the performance and value categories) to produce an overall numeric score for the product. Scores should be judged as follows:

10 — Excellent 9-10: — Taps in its class

Very Good 7-8.9

Meets all essential criteria and offers significant advantages

Good 6-6.9

Meets essential criteria and includes some special features

Satisfactory 5-5.9

Meets essential criteria

Poor 3-4.9

Falls short in essential areas

Unacceptable 1-2.9

Fails to meet minimum standards

Also Included
In This Section

• VP Expert67
• XYZ Model74

Q&A Write

Word Processor Standout Program in Its Market

Lotus, Dbase Integration, and File Card Manager Come as Bonus

By Diana Gabaldon Review Board

Symantec found a successful formula with its Q&A program — a database manager combined adroitly with a small word processor. Now the firm has followed up with Q&A Write, which instead combines a word processor with a small database manager.

Q&A Write is a superb choice for users wanting something unimposing and easy to use but with a fair amount of power. Although Q&A Write doesn't do everything the big, hairy word processors do, it has plenty of power for the average user and a number of nice little tricks that even the big guys don't have.

FEATURES:

The program works mainly off the function keys, but there are several different menus, each with its own function-key definitions. A menu at the bottom of the screen shows several of the most useful current functions, and the F1 key gives a complete function-key list, together with other help information. In addition, you can embed special commands in the text to control things like justification, printer and Postscript codes (for use with laser printers), and line spacing.

Q&A Write has all the standard cursor moves, but its Go To command also lets you move to a specific line of a particular page. You can also make a place in text to return to, but only one marker at a time will operate. When marking a text block, you can use all the cursor keys as well as the character keys to select text from the cursor up to a particular character. There is no delete to end of line command.

Macros are constructed from a separate pop-up menu. However, you must save and retrieve sets of macros separately for each file. You can retrieve a macro file and edit macros individually.

Print enhancements include italics as well as

and easy integration with Lotus 1-2-3 and dBASE set it apart from most other low-end word processors.

Search for:...

Replace with:

Method..... Manual Automatic Fast automatic

Type..... Whole words Text Pattern

Case..... Inconclusive Sensitive

Range..... All to End To beginning

Z52-5700 is technical support for registered users. (408)
Z53-9600 is technical support for non-registered users.

QUREV Insert 6% Line 1 of Page 7 of 7

Q&A Write can search and replace at three speeds, showing changes on-screen in manual and automatic modes, but simply making changes in memory in fast auto mode.

boldface, underlining, sub- and superscript, strikethrough, and special fonts. (These last have to be defined for your printer before they can be used.) Q&A Write is not a WYSIWYG package, but it does indicate print enhancements on-screen. Unlike most other word processors, Q&A Write shows not only the page breaks, but the top and bottom margins of each page as well.

The program has interesting frills such as a Draw function, which lets you draw straight lines and is as good as many drawing packages we've seen. Still more interesting is Q&A Write's miniature database handler. You can enter a card file from the main menu and edit, search, or sort a database with up to 1,000 records, up to 180

fields per record, 240 characters per field, and a maximum record length of 2,000 characters. The card file has a good selection of easy-to-use search procedures — "string equals," "does not equal," "is greater than," "is less than," "string begins with, ends with, or includes x." You can also use the Boolean Or, but there is no And available.

Information from the card file is output as a straight ASCII text file so it can be used by other programs as well as Q&A Write. While you can mail-merge card file information in a variety of word processing jobs, there is a separate Print Mailing Labels function. It sets up a mailing label job with one command, which summons a setup menu.

directly import ASCII files and PFS Write files. With Symantec's optional \$29 import utility, you can import files from PFS Professional Word Perfect, and 13 other word processing programs.

One of the few ease-of-use packages that supports laser printers, Q&A Write allows alternate font usage. This means, for example, that you could set up a letterhead in, say, 16-point Times Roman Bold, and then type the text of your letter in the standard 10-point Pica font. Which specific fonts are available to you depend on your printer. Special fonts are supplied by the printer vendor or outside software; Q&A Write just allows you to use or modify them.

Maximum document size is 140 pages (140 pages with expanded memory), which is probably enough for most applications.

PERFORMANCE:

Q&A Write's design shows a lot of thought and imagination. For example, movement keys are "nested," so that striking the same key repeatedly moves you in increasing increments in a given direction. Home, for instance, moves you to the beginning of a line, the top of the screen, the top of the page, and the top of the file if you press it once, twice, three, or four times.

Our tests show that Q&A Write is quite

Low-End Word Processor Benchmarks

Test	Easy Extra	PFS Professional	Q&A Write	Volkswriter Deluxe Plus	Write Now PC
Load File	0:01	0:01	0:02	0:02	0:02
Save/Continue	0:04	0:01	0:01	0:03	0:02
Save/Exit	N/A	N/A	N/A	0:03	0:03
ASCII Import	0:02	0:03	0:03	N/A	0:02
ASCII Export	Doc. Mode	0:02	0:02	N/A	0:02
DCA Translate	N/A	0:17	N/A	N/A	N/A
Cursor Top/Bottom	0:02	Immediate	Immediate	Immediate	Immediate
Manual Scroll	0:35	0:36	0:03	0:35	0:35
Margin Reformat	N/A	0:04	0:02	Para. only	0:04
Repape 20 Pages	Continuous	Continuous	Continuous	Toggle	Continuous
Search/Lost Word	0:04	0:04	Immediate	Immediate	0:01
Search/Replace	2:06	0:47	0:07	0:23	0:20
Append Document	0:06	0:01	0:04	0:02	0:02

System Configuration: IBM AT with 640K RAM, Test File: 40 paragraphs.

fast, especially at manually scrolling (more than 10 times faster than the competition) and searching and replacing. (See the accompanying benchmark table.)

Integrating Lotus 1-2-3 spreadsheets and Dbase programs into our documents went very smoothly. In fact, you can adjust Q&A Write for program editing, and it makes Dbase programs very simple to edit and export.

The card file works very nicely. You can have a card file in operation simultaneously with a word processing document (though you may not have two documents open simultaneously). We noticed only two flaws in the card file. First, you can't insert a new field between two existing fields; instead, you must add it to the end of the card record, an aesthetically displeasing approach if, for example, you have inadvertently left the city field out of a name and address file and have to put it after the ZIP code or start over. The second flaw is that moving the cursor to a new field causes the Insert mode to revert to Overstrike.

The program is designed to be very simple to use but to provide more power as the user becomes more familiar with it. Therefore, several functions are two-tiered. The simple version is called first, with the more advanced version available on request. A simple search, for example, takes place irrespective of case and direction; it searches from cursor to end of file, with a choice of manual, automatic, or fast automatic speeds. Fast auto is twice as fast as automatic, which leads one to wonder why one would ever choose plain automatic. The answer is that plain automatic shows changes on-screen as they are made, so you can catch a possible unwanted change or interrupt the Replace function. Fast auto makes all the changes in memory and then rewrites the screen afterward. The more advanced search menu lets you specify case, pattern match, and search direction. The simple search will not find embedded words but the advanced search will.

Q&A Write works very well for undemanding applications and really has enough power for, say, 80 percent of most word processing tasks. What doesn't it do that higher end packages do? Well, you can't do column-block manipulations, even though you can print in columns. There are no windows, and you can't have simultaneous documents in operation. The program doesn't handle footnotes, although headers and footers are available.

Mail-merging is quick and easy, but you can't program mail-merges for conditional or interactive modes as you can with more powerful programs. There is no direct typing capability, no outlining function, no indexing, no hyphenation, no multiple file use, no window-

orphan control, no style sheets, and no special characters (though you may be able to get some of these by using alternate fonts). If you don't need any of these things, you should be very happy with Q&A Write.

In its market, Q&A Write is a standout program. It's particularly fast at many tasks, especially scrolling manually through a file and at executing search/replace. Its integration of 1-2-3 spreadsheets and Dbase files and

its card file feature are also bonuses. We rate Q&A Write a very good performer.

DOCUMENTATION:

Documentation consists of one small spiral-bound manual. Considering the amount of material it contains, its compact size is surprising. Explanations are clear and well-organized. The manual also contains a good index and 10 appendices, which deal mostly with how to

integrate Q&A Write with other packages like Lotus 1-2-3, Dbase II and III, and Wordstar.

Help screens are plentiful and reasonably well-organized. However, there is not really context-sensitive help. You will get a help screen having something to do with the matter at hand, but most help screens are command summaries that contain a large amount of general information. We rate documentation as very good.

EASE OF LEARNING:

You can be editing a document within five minutes, and even those unfamiliar with databases will have no trouble at all figuring out the card file. There is a tutorial for only the card file, but it isn't really needed for the word processing part of the program. Menus are clear and helpful. Information is available from F1 at any time, and it's difficult to go astray. We rate ease of learning as excellent.

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002 073	PRINCIPAL BEG BAL ITD	2,027,738.21	2,027,840.21	102.00	
002 073	INTEREST EARNED MTD	7,378.14	7,378.14		
002 073	INTEREST ACCRUED LTD	17,689.27	17,677.98	11.28808	
002 073	GROSS BEG BAL ITD	0.00	0.00		
002 073	DISCOUNT UNEARNED ITD	0.00	0.00		
002 073	DISCOUNT EARNED MTD	0.00	0.00		
002 073	GROSS BEG BAL ITD-I	552,455.06	558,703.64	6,248.36	
002 073	DISCOUNT UNEARNED ITD-I	76,879.28	77,218.25		
002 073	DISCOUNT EARNED MTD-I	1,503.47	1,574		
002 073	DEALER RESERVE BEG BAL-I	40,201	40,201	70.5122	
002 073	INSURANCE BEG BAL MTD	2,149.65	2,244		
002 073	FORCE-CLOSE LOSS BEG MTD	0.07	0		
002 073	LOANS IN PROCESS BEG BAL	27,337.77	27,337		
002 073	SECONDARY PRIN BEG BAL ITD	5,257.55	5,257		
002 073	SECONDARY INT EARNED MTD	6.78	12		
002 073	SECONDARY INT ACCRUED LTD	68.11	12		
002 073	BRANCH TOTALS	2,754,365.			

Speed up data entry. Do it by hand.

EASE OF USE:

Q&A Write is quite easy to use. Menus are very well-organized, and the program's operation is logical and smooth.

When you retrieve a document from disk, it comes back with the cursor not at the top of the document but in the same place where you left it. This is a nice touch that we believe will encourage users to save documents frequently.

Most high-end word proces-

sors treat blanks and carriage returns as characters and will not allow the cursor to go any place on the screen not covered by a character. But Q&A Write is like some other word processors in letting the cursor cruise anywhere on the screen you want. Some prefer this full-screen cursor control, others find it annoying. Q&A Write also treats tabs as collections of individual spaces, so you can't delete a tab character in one

stroke; again, a matter of individual preference. However, the search function will search for carriage returns, page breaks, and print enhancements, which is convenient.

We rate ease of use as excellent.

ERROR HANDLING:

During our testing, we could not get the program to crash, even though we tried many odd keystroke combinations. Q&A

Write's error messages are very clear. There's also an appendix in the manual that further explains the messages.

The Delete buffer has an Undo. In addition, a Restore Text function lets you retrieve any accidental deletions. We rate error handling good.

SUPPORT:

Support is free to registered users, although calls are not toll-free. Hours are 8 a.m. to 5 p.m.

Pacific time, except for lunch. When we called the support line, all the technicians were busy. We were called back in five hours, and the information we were given was quite good. Extended support plans as well as a bulletin board service are also available.

Not only will the vendor replace defective media, but the program comes with a 30-day money-back guarantee. Q&A Write is not copy-protected.

Because of the money-back guarantee, the free support, and the lack of copy protection, we rate support very good.

VALUE:

In the market for easy-to-learn and easy-to-use DOS word processors, Q&A Write (\$199) competes with the likes of PFS: Professional Write (also \$199), Micropro's Easy Extra (\$149), and Webster's New World Writer (\$150).

What sets Q&A Write apart are its card file database manager, its easy integration with Lotus 1-2-3 and Dbase files, and its draw functions. We rate Q&A Write a very good value.

Dr. Diana Gubaldon is the founder and editor of Science Software and director of the Arizona State University Scientific Database Facility.

PC Magazine June 9, 1987

You're about to witness something amazing.
It actually reads computer printouts. And typed sheets.
You select the information you need.
For less than \$650, scan directly into Lotus 1-2-3.

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Q&A WRITE

	Unacceptable	Poor	Satisfactory	Good	Very Good	Excellent
7.8						
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY

One of the best of the easy-to-use word processors, Q&A Write offers speed and integration with Lotus 1-2-3 and Dbase files. Not copy-protected. For the IBM PC. Pros: Smooth operation; good design; the built-in card file is really special. Cons: Lacks windows and simultaneous document use.

PRODUCT DETAILS

List price, \$199. Version tested (1.0) available for IBM PCs, XTs, ATs, and compatibles. Requires MS-DOS or PC-DOS 2.0 or later, 384K of RAM (512K recommended), two floppy drives or one floppy and a hard drive. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.

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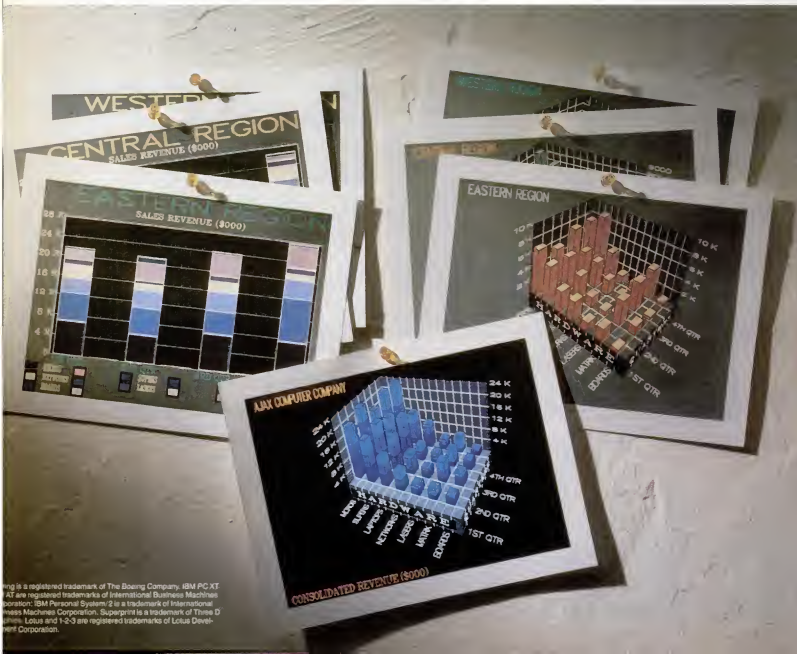
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BOEING



VP Expert

Inexpensive Program Designs
Expert Systems for Novices

By Paul Siegel Review Board

Because of the hoopla about expert systems, there is much uncertainty about what an expert system is and how you could build one. But the concept is actually simple: An expert system lets you store and use the problem-solving know-how of skilled and knowledgeable people — for example, physicians, architects, or geologists.

The hype, myths, and plain misinformation about expert systems abound largely because of the huge amounts of time and research that went into creating the first ones. The fact is, researchers soon found that the functions of the expert system didn't have to be limited to working with a particular type of information. Instead, the "brain" of an expert system could be made to operate on many different types of knowledge; and that discovery made possible the expert-system-building programs on the market today.

True, most of these products are complicated, expensive, and intended for experienced programmers and large computers. Not so with Paperback Software's VP Expert. It runs on the IBM PC and compatibles with 256K of RAM and MS-DOS 2.0 or later; it's easy for non-programmers to use; it has many of the capabilities of much more expensive products; and it's priced at just under \$100.

FEATURES:

VP Expert offers an excellent complement of features for the novice expert system developer. It takes you through all the steps of creating an expert system, from data entry through a typical "consultation" session with the client or end-user.

The first and most intimidating task is entering information into the expert system. VP Expert reduces the time this step takes by accepting ASCII text or input from a spreadsheet or database file. Once you've entered data into the information-storage portion of the system (the "knowledge base"), VP Expert's editor analyzes the data and derives the rules that govern it, creating a file containing those rules. (Naturally, the axiom "garbage in, garbage out" applies.) You can analyze the raw data yourself and form your own rules, or you can use either VP Expert's built-in editor or your own favorite word processor to modify or supplement the data or the rules in the knowledge base.

VP Expert can call external programs, and it can also exchange information with database programs, ASCII files, and spreadsheets (operating on a specified range of rows and columns at a time). VP Expert runs in the background while the called program (a batch file or indeed any other type of program) runs in the foreground. When the called program is done, the system returns to DOS and VP Expert picks up again right where it left off.

Once you've put all the necessary information into the knowledge base, VP Expert checks for syntax errors and gives you the chance to correct them. The next step is to test the knowledge base by seeing how it behaves when a client or user comes to consult it. VP Expert does so by taking you through a simulated

consultation session.

Multiple windows make the procedure easy: The first window displays the rules that are being tested as they're being tested; the second window shows the conclusions that VP Expert has reached based on the information in the knowledge base; and the third window lists the questions that the client or user would be asked. When the simulated consultation is done, VP Expert displays either text or a graphical tree that illustrates the complete reasoning path the program took to reach its conclusions.

In real life, you answer questions the

The Actions block is where you place clauses that represent the sequence in which you want the consultation to proceed. For example, you can include a Display clause that introduces the expert system, a Find clause to tell the system the goal variable you want it to search for by reasoning with its stored rules, and another Display clause to show the advice the system has to offer at the end of the consultation.

The words Display and Find are "keywords" — words you must use in introducing these clauses. You must also use them in writing rules. For example, a rule to determine whether the driver of a car is responsible for causing an accident might say: *If driver judgment = good And driver speed = proper And driver maneuver = proper Then accident responsibility = no*. CNF 100. (See illustration, Page 70.) The keywords here are If, And, Then, and CNF. CNF ("confidence") indicates the degree of certainty of the conclusion, which in this

about 50 rules — effectively one rule for each line. The ratio can vary, but only slightly, depending on the amount of data. Even though numerical values were given in the table, VP Expert could not come up with fewer, more general rules using numerical relationships. The main purpose of the Induction feature is to allow quick prototyping and feasibility determination. The text editor is for fine-tuning the rules that are induced and for adding flexibility in handling uncertainties.

Access to external files and programs multiplies VP Expert's functional capabilities tremendously. For example, you can use a sophisticated number-crunching or statistical analysis program to help the expert system make a decision, or you can use the expert system to simplify the interface between the user and complex simulation software.

VP Expert's interfacing capability and its use of induction and windows are fine. Offsetting this, however, is the need to remember keywords and syntax rules. We rate performance very good.

DOCUMENTATION:

The manual consists of a very simplified hands-on "Getting Started" tutorial for beginners, a discussion of access to external database and spreadsheet packages (for example, Lotus 1-2-3, dBase III, VP Info, and VP Planner), and a reference guide.

The tutorial is excellent. It uses sample knowledge bases as examples and takes you step-by-step through the procedures of accessing files, writing and editing the knowledge base, and managing a consultation session. At each point the manual shows exactly what you should be seeing on your monitor.

Unfortunately, the manual drops the tutorial approach in describing access to external programs. This section is more difficult to follow, and step-by-step explanations of the process would have helped immensely.

The many examples in the reference section make up for its sometimes abstruse, programmer-oriented approach to explaining syntax.

The manual has a bibliography — a nice touch — and an index. We rate documentation good.

EASE OF LEARNING:

VP Expert is easy to learn primarily because of its tutorial, which is organized very well. Once you're familiar with the procedure of designing an expert system, the program's equally well-organized menus let you work smoothly and

The first and most intimidating task is entering information into the expert system. VP Expert reduces the time this step takes by accepting ASCII text or input from a spreadsheet or database file.

expert system asks. The system then applies stored rules to those answers, in most cases through "backward chaining" — reasoning from goals to facts. VP Expert can also perform a limited type of "forward chaining" — reasoning from facts to goals. When the reasoning process is done, the system displays its advice to the client.

If the answer to a question isn't a simple yes or no, VP Expert lets you assign a "confidence factor" (a number from zero to 100) to an answer. The builder of the system can also assign a confidence factor that the user need never see.

PERFORMANCE:

After you've created or imported the knowledge base for your expert system, you'll spend most of the rest of your design time fine-tuning the system's interface with its users. You do this via the windows in VP Expert's Consulting mode. When you're in this mode, your monitor displays three windows, one occupying the top half of the screen and two sharing the bottom half. The upper window shows the dialogue — the questions VP Expert asks and the answers you select from a multiple-choice menu. This monitor also is where the system displays its advice when it arrives at a conclusion.

The bottom two windows help the system's developer find logical flaws in the knowledge base. The Rules window, on the lower left, shows the rule that the system is currently testing; and the Results window, on the lower right, shows partial and final conclusions the system reaches as the consultation progresses. When the expert system is ready for use by the client, the Rules and Results windows can be removed, leaving only the dialogue window.

The knowledge base consists of three basic groupings: an "Actions block," rules, and statements.

case would be 100 percent.

You can add an Else clause after the Then clause to specify what should happen if the If clause is false. You can also add a Because clause to the Then or Else clause to make VP Expert display the reasoning that led it to its conclusions.

VP Expert uses such statements primarily to define the variables in the expert system. Among the more important ones are those introduced with the keywords Ask and Choices. The Ask statement defines the question to be asked by VP Expert, and the Choices statement presents the legal answers to the question.

When you select Induce from the main menu, VP Expert converts a table into correctly formatted individual rules rather than decision trees. However, VP Expert's inductive powers seem to be limited. For a 50-line table, it gave us

THE NEWS WEEKLY

REPORT CARD

SOFTWARE

VP EXPERT

7.5	Unacceptable	Poor	Satisfactory	Good	Very Good	Excellent
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY

A well-designed program that lets novice users develop small to medium-sized expert systems on the IBM PC and compatibles. Copy-protected; non-copy-protected version available for an extra \$10. Pros: Interface with external programs; well-written tutorials and menus; easy to learn and use; inexpensive. Cons: No free support; \$10 fee for non-copy-protected disk.

PRODUCT DETAILS

List price, \$99. Version tested (1.01) available for the IBM PC or compatibles running MS-DOS 2.0 or later. Requires 256K of RAM, two floppy drives, and an IBM CGA or compatible graphics card for display of graphic traces. Paperback Software, 2830 Ninth St., Berkeley, CA 94710; (415) 644-2116.

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THE COMPANY BUSINESS Report
Volume 1, No. 1
May 1987

Desktop Publishing Increases Its Share of the Market

Employees Interested in Receiving Their Own Desktop Publishing Software

GEM Desktop Publisher Sets Price/Performance Benchmark for Software Industry

Digital Research announces its high performance way to use desktop publishing. GEM Desktop Publisher, introducing the true professional, is available at the end of May, at a suggested retail price of \$395.

"We're excited to provide an integrated team of products for personal publishing to our personal publishing community," said John Williams, Chief Executive Officer of Digital Research. "Users of GEM Desktop Publisher are now able to use a more complete and powerful tool than ever before. Text and graphics that were once tedious to create are now effortless with our product," continued Williams.

Flexibility is a key feature of the GEM-based software product. The user can define a position anywhere in a document and automatically place text or graphics in that location.

Continued on page 5

Projected Market Shares & Client Preference

As a product offering, it's the best thing that ever happened to personal publishing," says desktop publishing expert, John W. Geyrho, "about desktop publishing, in the May issue of Byte."

Desktop publishing, the latest development in microcomputers, offers the user the ability to combine text and graphics to create professional quality brochures, newsletters, manuals, sales reports, invoices, forms, and other publications on their own computers. And, as Stewart Geyrho, Editor of PC Magazine, said in his February 1987 issue, "The desktop publishing revolution has been looking for a better chapter, later will get words and pictures on paper."

Growth for PC Software Market
Software Revenue for U.S. Suppliers

Year	Large mainframe	Desktop mainframe	PC
1982	100	10	5
1983	110	15	10
1984	120	20	15
1985	130	25	20
1986	140	30	25
1987	150	35	30
1988	160	40	35
1989	170	45	40
1990	180	50	45

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37.	75.	113. BOSTON, MA Blue Hill Business Systems, Canton	151. ST. LOUIS, MO
38.	76.	114. Communicatel, Inc., Canton	152.

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157.		194.		231.	PROVIDENCE, RI Software Center R.L., Warwick	268.	OTHER KEY MARKETS Olenky Bros., Mobile, AL
158.	RALEIGH-DURHAM, NC	195.		232.		269.	The Computer Tutors, Red Bluff, CA
159.	MANCHESTER, NH	196.		233.	COLUMBIA, SC	270.	Data Systems West, Sherman Oaks, CA
160.	NASHUA, NH White Mountain Computer	197.	POUGHKEEPSIE, NY Software City of Wappingers Falls	234.	GREENVILLE-SPARTANBURG, SC CMS-Microfix, Anderson	271.	Alpine Computer Center, Rockford, IL
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176.		213.		250.	SAN ANTONIO, TX The Personal Computer Store	287.	
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XYZ Model

Financial Model Builder Suffers From Serious Limitations, Bugs

By John Walkenbach Contributing Editor

XYZ Model is a 1-2-3 aftermarket product intended to simplify financial model building and to allow users to work with meaningful variable names and clearly defined relationships between the variables.

A financial model (or any spreadsheet-based model) consists of statements that describe relationships among variables. XYZ Model analyzes a spreadsheet file and translates the row names, column names, and formulas into a concise set of English-language statements, which you can then manipulate instead of dealing with the spreadsheet per se.

In reviewing this product, however, we were frustrated by its limitations, annoyed by its bugs, and astounded at how easily erroneous conclusions could be reached because of it. XYZ Model has some serious problems.

Although we like the concept of XYZ Model, its performance is far below our standards.

FEATURES:

XYZ Model reads 1-2-3 or Symphony worksheets directly. It translates the row and column titles into variable names, and it also converts your worksheet formulas into descriptive statements of their interrelationships — features similar to those performed by Clarity Software's Cellmate. (See review, October 27, 1986.)

But XYZ Model attempts to take this idea much further. Once the formulas are derived, you can manipulate and work with the variable names and relationships directly. You can then save both

the model and the worksheet into separate files. Retrieving your updated worksheet in 1-2-3 or Symphony will reveal modified formulas that are based on the alterations you made while you were in XYZ Model.

Models are stored in ASCII files separate from the worksheet, letting you define a single model for several identically formatted spreadsheets — for example, annual budget models for several departments within a company.

The advanced version of the product adds goal seeking, sensitivity analysis, and simultaneous equation solving.

XYZ Model doesn't support expanded memory.

PERFORMANCE:

We were initially impressed with this program's ability to translate formulas — even extremely complex formulas — into its fairly complete modeling language.

But then we tried loading in several relatively complex spreadsheet models. None translated successfully. We devoted the remainder of our efforts to trying to get just one of our models working correctly. We eventually succeeded, but concluded that the end result was not worth the effort. Simple models generally work just fine — but with a simple model you don't need a product such as this.

Our problems of getting a complex model into the program, and in subsequent operations, often revolved around XYZ Model's rather exacting requirements. For example, the first row of the defined data range must contain a formula; our formula began in the second row, so XYZ Model failed to translate it properly. XYZ Model expects function arguments to be in the form of a range, and it balks at legal worksheet formulas such as @MAX(A1:A3A5). The program ignores column width settings, making some worksheets almost unrecognizable; and it also drops the commas from comma-formatted numbers, making large numbers fairly difficult to read.

We found a few bugs. The modeling language keyword "but" didn't work

```

Column equations      (Push F2 to view)
Row equations (F3-Calc ESC/Main Menu)      Line 58 of 113
*****
PhoneInstallation = IF T0T87
TotalExpenses = IF T0T87
                Then SIKK previous 12 TotalExpenses.previous TotalExpenses >
                Else SIKK DirectInitCosts..PhoneInstallation >
MonthlyNetIncome = IF T0T87
                Then SIKK previous 12 MonthlyNetIncome..previous
MonthlyNetIncome = Else ActualCommission - TotalExpenses
VTDNetIncome = IF JAN87
                Then MonthlyNetIncome
                Else IF T0T87
                Then 0
                Else previous VTDNetIncome + MonthlyNetIncome
MonthlySalesVar = IF T0T87
                Then 0
                Else ActualSales - Proj.Sales
MonthlyGrossCommVar = IF T0T87
*****

```

Calculating the Row Model...

Finding JAN87 NetSInTraining that produces 60000 in APR87 Proj.Commission

Address of SOURCE cell: C8
"NetSInTraining, JAN87"

	C	D	E	F	G
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
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Portable computers fit a predictable pattern. The more powerful they are, the less portable they are.

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It's the best shape power has ever been in. A smaller, slimmer profile that's tailored to you, instead of the other way around.

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Other comp trying to get

Six years ago, when we introduced the original dBASE®, it belonged in a category all by itself.

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on all major local area networks.

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ASHTON-TATE

dBASE III PLUS

the data management standard



editing the English language equations that make up the model.

When you're in XYZ Model, you get a view of your worksheet but cannot see the actual formulas. Although the modeling language does translate the formulas for you, we would still like to be given the option to view the original spreadsheet formulas.

On the positive side, a function key brings up a menu of all

variable names, which can be useful.

Our score of poor for ease of use stems from the program's generally out-of-date user interface and from its lack of direct connectivity to the spreadsheet program.

ERROR HANDLING:

There are quite a few error messages that you might encounter while running XYZ Model. Most are fairly self-

explanatory, and you're usually given the chance to correct them. There are four serious error conditions that require exiting the program; without really trying, we happened to encounter two of these fatal errors within the first hour of testing the program. The errors are not explained in the XYZ manual; instead, you are asked to report these problems to Intex Solutions (on your own dime).

Pressing Shift-F10 immediately halts the program and returns you to DOS — no confirmation is required. We haven't seen such a drastic exit procedure from a program in some time.

Error handling does not come up to our standards. We rate the product poor in this category.

SUPPORT:

Support is one area where this

product really gets a chance to shine.

XYZ Model is not copy-protected, and telephone support is available, although you do have to pay the line charges.

We called to inquire about some of the limitations we've mentioned. We were immediately connected to a knowledgeable and helpful technician who admitted that we had indeed uncovered a few bugs in the program. He volunteered some work-arounds to help us with the problems.

Intex Solutions recently shipped Version 1.2 (the version we tested) at no cost to all users of previous versions. The company also provides a quarterly newsletter to all XYZ Model users who are registered, and the product has a 30-day money-back guarantee.

We feel that the support for this product is much better than average in its market, and we were particularly impressed with the telephone support pro-

2 new monitors for the System/2.[™] 2 good to be true.

Some people shy away from technological change. But at Amdek[®], we look upon change as an opportunity.

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Compared to
recent 1-2-3
add-in
products,
XYZ Model
seems
archaic and
demanding.

vided. Its rating of excellent is well-deserved.

VALUE:

Intex Solutions makes a whole line of 1-2-3 add-on products. We awarded high marks to 3D-Graphics in our August 3 review (rating it 8.4 overall), and from what we've seen of XYZ Consolidate and XYZ Query, they do their jobs well. Don't confuse them with Version 1.2 of XYZ Model, which doesn't measure up to its siblings.

If you're serious about financial modeling and like the idea of using English language variable names, then consider a dedicated modeling product such as Javelin (see review, March 23), which at \$199 costs only a few dollars more than XYZ Model at \$145. (XYZ Model, Advanced Version costs \$395 but includes a free copy of your choice of XYZ Consolidate, XYZ Spread, or XYZ Query.)

Because of the limitations, the difficulty of using it, and the unreliability of the results, we cannot recommend the current version of XYZ Model. We rate value unacceptable.

John Walkenbach is a consumer research manager for a leading savings and loan association in Southern California.

Hardware Reviews

The Accelerator SE, like its competitors, boosts a stock SE's performance to a level higher than that of the Mac II.

REVIEWS POLICY

InfoWorld publishes each year in-depth reviews of approximately 300 microcomputer products we judge important, interesting, and useful to our readers. To submit a product for review consideration, send product announcement, marketing materials, demos, or ad copy describing the product to Reviews Editor, InfoWorld, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025. (Send news and new product announcements separately to News Editor.) Please do not send hardware. Unsolicited materials are not returned.

The editorial review board selects products for review for each cycle. If your product is selected, you will be contacted to arrange shipment of the product for review. We request two copies of software; we return hardware, but not software, after review.

Because of the volume of submissions, we regret we are unable to contact vendors regarding products not selected for review.

Also Included
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Radius Accelerator SE

Inexpensive Board Boosts Mac SE's Performance

But Its Documentation and Warranty Leave Much to Be Desired

By Don Crabb Contributing Editor

The Radius Accelerator SE is an accelerator board that plugs into the 96-pin Eurobus expansion slot of the Macintosh SE. The basic configuration (\$1,495) includes a Motorola 68020 CPU (the same chip that's in the Mac II) running at 15.67 MHz; 32K of fast static RAM cache; and a 16-bit I/O expansion bus (the Radius Magic Bus), which can connect to Radius' Full-Page Display (FPD) monitor.

Optionally available is a matching 68881 math coprocessor. There is no room for additional RAM on the board, however.

FEATURES:

The Accelerator SE, like its competitors (General Computer's Hypercharger 020, reviewed July 6, and the Levo Prodigy SE, reviewed July 27), can boost the performance of a stock SE to a level higher than that of the Mac II. The performance increase comes from substituting the faster 68020 CPU for the SE's slower 68000.

In addition to running twice as fast, the Accelerator's chip has a 32-bit data path, twice that of the stock SE's 16-bit 68000. The Accelerator also comes with a bit of superfast RAM used to cache data and program code to further improve your machine's performance.

The Accelerator works with existing Mac RAM, like the Hypercharger 020, but unlike the Prodigy SE, which comes with 1 megabyte of RAM.

Since the 68020 can imitate the 68000 (by running slower and disabling its instruction caching), most existing Mac

software runs on the Accelerator SE. For some of the applications that do not follow the recommended programming standards published by Apple, the Accelerator can be bypassed when the machine is started, turning the system back into a plain-vanilla SE.

The 68881 math coprocessor chip supports the Standard Apple Numeric Environment (SANE) for floating-point arithmetic. For maximum performance, the 881 can also be addressed directly by those applications that were designed for the 68020/68881 environ-

ment. Unlike General Computer's Hypercharger 020, the Radius SE Accelerator does not support a special version of SANE biased for speed (at the expense of extremes of precision). The Accelerator SE's SANE is kept in firmware, where it can be accessed quickly.

Unlike the Hypercharger 020, with its special I/O file, and the Prodigy SE, with its system resource, the Accelerator has no additional software. However, the Accelerator's control panel resource (accessed during start-up) allows you to turn off the accelerator, turn off the data cache, or turn off the code cache (turning them off slows down the board, sometimes useful for compatibility testing).

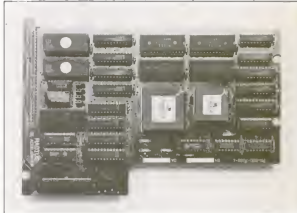
The Accelerator board is about 8½ inches by 4¼ inches and weighs less than half a pound; it draws 5 watts, which was no problem for our SE's power supply or fan.

PERFORMANCE:

The performance of the Accelerator depends upon how you have its options set. The maximum performance increase can be obtained by turning on both the code and data caches.

We tested the Radius Accelerator SE on a standard Macintosh SE with a 20-megabyte internal hard disk (the same system we used to test the Levo Prodigy SE).

Our Accelerator board arrived with the 68881 installed. During our benchmark tests we disconnected the SE from our AppleTalk network, and we ran



The Radius Accelerator SE increases the Mac's performance by substituting the faster 68020 CPU for the SE's slower 68000.

all the tests with the Apple RAM cache disabled. During our software usage tests, we reconnected AppleTalk.

We ran the same benchmarks that we had run on the SE, the Mac II, the SE with a Hypercharger 020 installed, and the SE with the Prodigy SE installed.

The disk drive test results showed no improvements for the Accelerator over the stock SE. (The Hypercharger showed the same results; the Levo Prodigy SE, by contrast, improved random-access speed by 7 percent and sequential access by 5 percent.)

In InfoWorld's CPU tests, the Accelerator SE did not produce as great a performance boost as the Hypercharger 020. Using the fastest Accelerator configuration (data and code caches on), we obtained a speed index

higher than a stock SE, higher than a Mac II, higher than a Hypercharger 020 with no cache or with ROM cache only enabled, and higher than a Levo Prodigy SE with one or the other of its caches off.

But the Accelerator was slower than the Levo Prodigy SE with all caches on and significantly slower than the Hypercharger 020 with both caches enabled.

We also tested the Accelerator's compatibility using the same suite of software that we had run by the Prodigy SE board. An Excel 1.04 worksheet of 25 columns by 100 rows of multiplication formulas took 11 seconds to recalculate on a standard SE, 2.1 seconds on a Mac II with 1 megabyte of RAM, and slightly more than one second with the Accelerator. We found similar performance levels using

Trapeze and Mac Spin, which are compute-bound, floating-point-intensive programs. We also noted increased floating-point performance of programs written in AB Soft's Mac Fortran and Consulair's Mac C languages.

One of the most convenient by-products of the speed increase provided by the Accelerator was a simple one: scrolling speed. Having spent agonizing amounts of time scrolling through large documents in Mac Write 4.5 and Microsoft Word 3.01, we learned to love the improvement provided by the Accelerator.

INFO WORLD THE NEWS WEEKLY

REPORT CARD

ADD-ON BOARD RADIUS ACCELERATOR SE

	Unacceptable	Poor	Satisfactory	Good	Very Good	Excellent
7.7						
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Setup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serviceability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY

A 68020-based accelerator board for the Apple Macintosh SE, the Accelerator SE also has a Magicbus expansion bus to accommodate Radius' Full-Page screen. Pros: Easy to set up and use; installation not difficult for experienced technicians; works well; highly compatible; strong performance; lower-priced than competitors. Cons: Documentation lacks vital information; warranty limited.

PRODUCT DETAILS

List price, \$995; \$1,390 with 68881 chip. Model tested includes 16-MHz 68020, 32K cache RAM, Radius Bus connector, 68881 math coprocessor. Available for Apple Macintosh SE with 1 megabyte of RAM, Radius Inc., 404 E. Plumeria Drive, San Jose, CA 95134; (404) 434-1010.

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10 MEGAHERTZ

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BASESYSTEM

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- Dual diskette drive / fixed disk controller
- Enhanced, 101-key keyboard
- Clock-calendar with battery backup
- 200-watt power supply
- Illustrated installation and operations manual

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IMS-88

10 MEGAHERTZ

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1200 Baud External Modem...\$119

Multifunction Board...\$125

Intel 80287-8 math coprocessor...\$269

256K Chips (150ns)...\$29

256K Chips (120ns)...\$35

PC I/O Board...\$69

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tor board.

We successfully tested the following applications for compatibility: AppleShare 1.1, Tops 3/18/87, Hypernet 2.0, and Mac Serve 2.1 for AppleTalk compatibility; McMax (beta), Multiuser Double Helix, Filemaker Plus 2.0, Reflex 1.0, Overview 2.0d, and Fourth Dimension 1.1 databases; Mindwrite 1.1, Write Now 1.0, Word 3.0.1, and Mac Write 4.5 word processors; Multiplan 1.1, Trapeze 1.0, and Excel 1.0.4 spreadsheets; Mac Paint 1.5, Mac Draw 1.9, Super Paint 1.0, Full Paint 1.0, Cricket Graph 1.0, Cricket Draw 1.0, and Easy 3D 1.0 graphics packages; AppleLink 1.0, Mac Kermit 1.0, Mac Terminal 1.1, Versaterm Pro 1.1, and Red Ryder 9.4 telecommunications products; and Data Desk 1.1 and Statworks 1.0 statistical analysis programs. All of these programs and many others worked flawlessly on the Accelerator SE (as they had on the Leveo Prodigy SE).

The only two programs that wouldn't work on the Accelerator SE were programs that also wouldn't work on the Mac II or on the Leveo board: Jazz 1A and Pro 3D. This is not a problem in faulty hardware design. The problem with Jazz is an incompatibility with System 1.1; the Pro 3D problem stems from its incapability to work with any 68020-based machine.

In short, we found no significant compatibility problems with the Accelerator SE; it was more compatible with existing Mac software than the Mac II is. Its software compatibility level was about the same as the Prodigy SE's, and pleased us better than the intermittent glitches we experienced when we were testing the Hypercharger 020.

Besides the improvement in executing programs, you will notice that the Accelerator accesses and saves data to and from your disk faster. A 50K Word 3.0 file consisting of the text string "The quick brown fox jumped over the lazy dog" repeated over and over, took 21 seconds to save on a stock SE. The same file took seven seconds to save on a Mac II and 11 seconds to save on the Accelerator. This is because the board speeds up calculations involved in preparing data for saving.

As a performance booster to the Mac SE, the Accelerator SE does the job. While it doesn't offer as much of a boost as the Hypercharger 020 in full legality, it will still beat a Mac II in most program executions and keep up with it when doing heavy disk access work. Its top performance was only marginally slower than the Leveo Prodigy SE.

Like the Prodigy SE, the Accelerator proved to be a rock-solid board during our test period, causing no system bombs or other problems for us.

While you don't get a full Mac II with the Accelerator —

there are no Nubus slots or color display here — you do get a very fast SE that retains its portability and that proved more compatible in software testing than a Mac II. We rate its performance excellent.

DOCUMENTATION:

In a word, poor. The Accelerator SE comes with two manuals: one for installation and one for users of the board. Both are far too brief and vague to be useful.

they were definitely inferior to those provided by Leveo.

If you've never done a board installation in an SE before, don't try it with the information in this installation manual. There is simply too little information.

We rate the documentation poor.

EASE OF USE:

Once you've installed the Accelerator SE, using it is as easy as

firing up the Mac. Ease of use doesn't get any better than this for add-on boards, so we rate this product excellent in this category.

SETUP:

Radius requires that an Apple Level One certified technician install the Accelerator SE. Considering the poor installation guide, we wish all such technicians good luck.

We've had lots of SE installa-

tion experience, so we installed the board ourselves. The process was fairly easy, once we learned to ignore the installation guide. We got the whole thing done in about an hour. Since there is no software to install, you save a step required by the Leveo and GC boards.

Despite the poor installation guide, installing the Radius Accelerator board was easy for an experienced SE installer, so we rate setup as good.



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SERVICEABILITY:

Radius gives you a standard "90-day wonder" warranty. You return the board to an authorized Radius dealer (or directly to Radius) for repair during the warranty period. Radius does not provide a maintenance agreement for extended warranty coverage, a disadvantage compared to the Hypercare service available for the Hypercharger 020. No vendor telephone number is provided in the documentation.

Fortunately, the Accelerator SE appears unlikely to fail under normal service; a month-long test revealed no problems. It's a modular board that can be repaired or replaced quickly if it does break down (and the Mac can still be used once it's removed).

Balancing its solid modular construction and design, along with its good reliability, against its mediocre warranty, we rate the serviceability of the Accelerator satisfactory.

VALUE:

The Radius Accelerator SE is an excellent performer, beating a Mac II in our benchmarks and comparable to the Levo Prodigy SE in its speed. The Accelerator costs \$995 (or \$1,390 with a math chip), which is \$500 cheaper than the Hypercharger 020 or the Levo Prodigy SE, both of which come with a megabyte of RAM.

The Accelerator SE is a good design from an experienced vendor of Mac hardware add-ons, and it is less expensive than its competitors. We rate it a very good value.

Don Crobbs is the director of undergraduate computer science instruction at the University of Chicago and a contributing editor of InfoWorld.

BENCHMARK TEST**Macintosh Performance Results**

Configuration	Index
Macintosh SE (NO CACHE)	1.00
Macintosh SE WITH HYPERCHARGER 020 (NO CACHE)	1.90
Macintosh SE WITH RADIOS ACCELERATOR SE (CODE AND DATA CACHES OFF)	2.78
Macintosh SE WITH HYPERCHARGER 020 (ROM CACHE ON)	3.15
Macintosh SE WITH LEVO PRODIGY SE (NO LANE/BIU, NO INSTRUCTION CACHE)	3.41
Macintosh II (NO CACHE)	3.84
Macintosh SE WITH LEVO PRODIGY SE (NO LANE/BIU, INSTRUCTION CACHE ON)	4.21
Macintosh SE WITH RADIOS ACCELERATOR SE (CODE AND DATA CACHES ON)	4.22
Macintosh SE WITH LEVO PRODIGY SE (LANE/BIU, INSTRUCTION CACHE ON)	4.25
Macintosh SE WITH HYPERCHARGER 020 (RAM CACHE ON)	4.35
Macintosh SE WITH HYPERCHARGER 020 (RAM AND ROM CACHE ON)	5.20

SOURCE: INFOWORLD HARDWARE BENCHMARK SYSTEM



The IBM PC Convertible 3 adds a collection of desktop utilities and RAM that retains data when the system is turned off, but it does not emulate colors in its LCD display.

IBM PC Convertible 3**Big Blue Laptop Update Offers Software, Nonvolatile RAM**

By Sherwin Levinson Review Board

It's not that IBM is standing still with its Convertible laptop — note the Convertible 3's new, more readable backlit liquid crystal display (LCD). It's just that the competition is moving much faster in improving laptops.

Despite IBM's improvements to the Convertible, other laptops from other vendors already offer faster CPU performance, more memory, and more features — all for less money. Thus the Convertible 3 remains an undistinguished entry in what has become a strongly competitive field.

FEATURES:

The PC Convertible 3 has some noteworthy features. Since the machine uses only nonvolatile memory, you can configure it to retain your work when it's shut off. When you turn the machine on again, you're back exactly where you left off. This feature can be a real time saver if you use programs that require lengthy setups. For example, if you deal with large spreadsheets, it's a real boon to be able to shut off the machine while you do other things (like board a plane), then turn it on and be back at the same cell you were working on without needing to reload the program and spreadsheet, then figure out exactly where you were when you left off.

The other feature that stands out from the ordinary is the included software. A disk-based introduction to the PC Convertible makes particularly good use of graphics and should make it very easy for even a novice to learn to use the machine. Also included with the Convertible is a set of desktop tools that comes under the umbrella of the Application Manager: a notepad, a calculator, a telephone book, and an appointment scheduler.

Once you've purchased DOS (an optional extra, for some reason), you may add your own application programs to the menu of desktop tools, or you may exit directly to DOS. In either case, you one of the desktop tools may be suspend-

ed exactly where you leave it while you are using another one of the tools, another program, or DOS. This is a handy feature that is not supported by some other pop-up utilities packages, such as those supplied with the NEC MultiSpeed.

PERFORMANCE:

The new display is about average in readability for the current generation of electroluminescent (EL) backlit LCD displays. As with most backlit displays, it should be easily usable under just about any lighting conditions.

Although wider than some, the display is not as high as most. The display's ratio of width to height is a lopsided 2.9, compared to 1.9 for the NEC MultiSpeed and 1.3 for the Zenith Z-181 and Z-183. This makes graphics intended for an IBM color graphics adapter (CGA) display appear particularly squashed.

The display is easy to remove, which can be a real advantage if you intend to use an external monitor with the Convertible 3. It appears, though, that IBM has made no effort to emulate colors on the LCD display. This limits its usefulness with some software packages that make effective use of color, or at least requires that you reinstall software already set up for a color monitor so it will display in black and white. Competing laptops show color in different shades of gray, and some machines let you modify the way color is shown to get the best contrast.

IBM has not improved the Convertible's processing speed. The 80C88 processor still runs at 4.77 MHz. The Convertible 3's performance, which scored an XT-like 0.35 on InfoWorld's CPU test, does not approach the performance of machines like the NEC MultiSpeed, the Toshiba T-1100 Plus, or the Datavue Spark, which run at speeds of 8 MHz and higher. Scores for those machines range from 0.59 to 0.91 — all significantly better than the Convertible's

showing. (An IBM AT running at 6 MHz serves as the baseline of 1.00 for the CPU speed test.)

The Convertible 3 has finally caught up with its competitors in memory size, allowing users to expand it to a full 640K, as against the original 512K maximum. But the base-price unit comes with just 256K.

All in all, the PC Convertible's performance doesn't stand out as any-

Despite IBM's improvements, other laptops offer more — for less money.

thing special. The capability to suspend applications when the machine is shut off is certainly a plus but is offset by the slow recharge speed and lack of color emulation. We therefore rate performance satisfactory.

DOCUMENTATION:

The manual remains thorough and laudably comprehensive, although its ample coverage of power sources and other off-Broadway topics may cause some novices to nod off. There's also a disk-based introduction to the system's important features.

The score for documentation remains very good.

EASE OF USE:

Despite the extra power drain of the PC Convertible's backlit display, its battery life exceeded 4 hours in our benchmark tests, which are designed to gauge the minimum life you can expect from the rechargeable battery under normal to heavy use. For comparison, battery life for other laptops we've tested with EL-backlit LCD displays ranged from about 2½ to 3½ hours.

Battery life has its price, though, in terms of weight. The rugged metal case and high-capacity battery help bring the weight to over 13 pounds, the heaviest laptop we've tested, excepting those with hard drives.

Keyboard design is an issue with all laptops, and the Convertible has its quirks. The arrow keys in the cursor pad also function as the Page Up, Page Down, Home, and End keys. Also note that the Caps-Lock key is located above the left Shift key, where you would normally expect to find the Control key, and the Control key in turn is below the left Shift key.

The included set of desktop tools is a plus. But this is offset by the machine's weight and its keyboard peculiarities. We rate the Convertible's ease of use satisfactory.

SETUP:

Setting up the basic system is quite easy. But you'll likely have more trouble installing options (such as memory upgrades), drawn largely to the sketchy instructions that are provided with the machine.

As before, setup earns a satisfactory rating.

SERVICEABILITY:

With the Convertible 3 you get extensive diagnostic software and are told clearly how to use it. The Convertible is covered

The PC Convertible's capability to suspend applications when shut off is a plus but is offset by the slow processor speed and lack of color emulation.

by a one-year warranty. Extended support plans are also available from IBM.

We again rate serviceability as very good, largely because of the included diagnostics.

VALUE:

The price of the Convertible has dropped. Where the original Convertible

cost \$1,995, the Convertible 3 has a list price of \$1,695 for a 256K machine with a backlit display and two 3½-inch disk drives. A 256K memory card costs \$345, while the 128K memory upgrade costs \$160, bringing the price of a 640K system to \$2,200.

This price does not include video outputs, serial port, printer port, or an

operating system. By the time you add these options (which most people would consider necessities), the Convertible 3 will cost you \$2,770, substantially more than the Datavue Spark (\$1,510), the NEC Multispeed (\$2,495), or the Zenith Z-181 (\$2,399). (For a more thorough comparison of these and other laptops, see the laptop special report in last week's issue.) All of these machines also substantially outperformed the Convertible 3 on our benchmark tests. Because the Convertible 3 costs more yet still does not perform as fast as competing machines in the market, we rate the Convertible 3 a poor value.

Sherwin Levinson has been working with computers for more than 20 years, specializing in computer conferencing, telecommunications, and user support.

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Documentation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Ease of Use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Setup	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Serviceability	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Value	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

SUMMARY

The Convertible 3 is an upgrade of IBM's laptop computer. *Pros:* Non-volatile RAM means you can shut off the machine, then turn it on and be exactly where you left off; included tutorial and desktop utilities; long battery life. *Cons:* With necessary options (DOS, ports), costlier than competitors that include options as standard equipment; heavy; slow processor.

PRODUCT DETAILS

List price, \$1,695 (base model). Includes 256K of RAM, 80C88 CPU running at 4.77 MHz, two 3½-inch disk drives, backlit LCD display, keyboard, desktop utilities, tutorial. 256K memory card, \$345; 128K memory card, \$160. IBM Corp., Old Orchard Road, Armonk, NY 10504; (800) 447-4700.

Review Responses

DATEASEE USERS RESPOND

I am a microcomputer consultant, a systems analyst, and a programmer with several years' experience on the Dateasee database management software (reviewed August 24).

Under ease of use you complained that some of the report menus required a considerable number of keystrokes to get all the options. Dateasee, however, allows the experienced user to type all statements into a simplified word processing environment, then checks them for syntax errors before moving on. You may even have Dateasee show you all the options available at the point that a syntax error is detected.

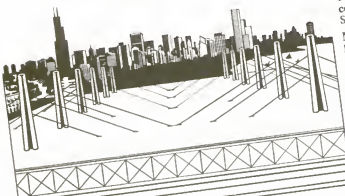
Under error handling you really gave Dateasee an (undeserved) beating. You mention that you may enter a duplicate record by pressing F2 twice. If you had done your homework, you would have found that Dateasee will automatically detect and prevent the entry of duplicate records, if the user simply defines an adequate unique key (something which can be easily done, and unlike many less capable programs, changed at will). Blaming Dateasee for your inability to design an adequate application is hardly fair. Additionally, you criticized the capability to exit Dateasee by using the

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Michael Miller
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Ctrl-C combination (while noting that Database recovers without data loss). First, you can avoid this by changing one line in your Config.Sys file to say "Break=off." Second, since when is an adequately handled method of exiting a program a bug? In all the installations I have done (over 40) no one has ever lost data due to this problem. That is a track record which speaks for itself.

As a longtime user of Database, let me make a couple of criticisms of the product. The company has a tendency to release products before they have been adequately tested (the recent recall of Database Multiuser is one example) and to announce product delivery dates to which they cannot hold (the seven-month delay in the delivery of the current Version 2.5 is an example). As you noted, their technical support department does a poor job of diagnosing problems and offering solutions.

What your review did not detect was that once records and indexes reach a certain size (depending on the number and size of the indexes and unique keys), Database's performance falls off drastically. I have one application where the user waits 20 to 30 seconds after pressing the return key before the application is prepared to accept another record. This is obviously unacceptable. In other applications, reports must be broken up, because Database does not have enough RAM to do the subgrouping and sorting required on large amounts of data. Reorganizing (the only way to rebuild damaged indexes or add a new index) can take as long as 18 hours on large databases.

Finally, though, let me reiterate that Database is a fine product that is vastly underrated by many database users (and reviewers). I have found it capable, reliable, and perfectly suited for many small to medium-size applications. It required a medium amount of skill to program, and it also allows clerk-level typists to easily run sophisticated applications.

Lee Drake
Database Consultant
Azar Microsystems Inc.
Rochester, NY

I use Database constantly and cannot agree with the claim that a "major flaw" in the product involves being put back into DOS when the Ctrl-C or Ctrl-Break keys are hit. This is simply not a problem and certainly not a "major flaw." In my experience, I've never seen these key combinations pressed by accident. In fact, if I should want to break out quickly on purpose, I'm glad I have the option.

In addition, my dealings with Database support personnel have shown them to be extremely able in solving tough problems, so I can't agree with its rating of poor for support.

Dan Grabai
Solano Beach, CA

Your review of Database confirms what many database consultants have known for a long time—that it is one of the most powerful, easy-to-develop applications engines unknown to the common user. In a sea of quality DBMS products,

Database is a winner for the developer who is most concerned with the user's environment and needs.

Database uses the F5 key and F6 key as form and field clears, respectively. To chastise the system for providing excellent user-oriented devices for rapid data entry, calling them instead error handling "problems," is questionable. For the developer, the use of function keys is excellent for development tasks. For users who are shielded from the "back room" of the application, the function keys provide a myriad of features to ease data entry, report generation, and add hoc queries.

What is most incredible about the review is the comment on phone support. Have you ever gone through the recurring agony of trying to get timely support from Ashton-Tate on any of their

products? I have never been disappointed with technical or timely support from Database or Microrim.

As developers of vertical market DBMS applications that emphasize the interaction of the user with the systems, we find Database to be a gem. Its performance and ease of learning (and use) qualify it as a "must see" for any serious applications developer.

Douglas J. Greenstein
Director, Management Advisory Services
Samuel Klein and Co.
Newark, NJ

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On the Horizon

By William F. Zachmann

RT PC Offers Unix-Based Alternative to IBM Proprietary Environments

IBM recently held a briefing on IBM Unix for industry analysts and consultants. It was, for IBM events of this type, uncharacteristically informative and thought provoking. In addition to summarizing the significant content of the presentation here, we'll explore some of the possible ramifications.

Significantly, the Boston seminar turned out to be focused at least as much on the RT PC as on Unix. Given that I had just about forgotten about the RT, mentally classifying it with the PCjr, I

was surprised to find myself taking a renewed interest in it.

Credit for that must go to a very well-informed, as well as informative, presentation by Larry Loucks, a member of IBM's senior technical staff at the IBM Engineering Systems Products Division in Austin, Texas, and a key system architect of the RT PC. Seeing the RT from Loucks' perspective made more sense than previous impressions I'd had.

In the first place, it was very clear that the link between Unix and the RT PC is

no accident. In Loucks' view of the world, on the contrary, Unix and the RT are simply aspects of a single approach to computing. What is most fascinating about this view, however, is how different it is from IBM's mainstream view.

What Loucks described was a consistent operating system and networking strategy stretching from the desktop to the mainframe based upon an IBM-enhanced Posix (the emerging IEEE standard version of AT&T's Unix) in the form of IBM's AIX. This amounts, in

fact, to what is in effect a "shadow architecture" paralleling IBM's mainstream OS/2-to-MVS/SNA/SAA world.

What makes this remarkable is that it clearly is not just some sort of aberrant, subversive strategy being pushed from some remote corner of IBM.

Undoubtedly the primary reason for this is that IBM wants to be a viable competitor in markets where, for one reason or another, Unix is required. The initial introduction of IBM's Unix version to run under VM was obviously motivated by the IBM Federal Systems Division's need to have a standard Unix offering in order to bid on U.S. government procurements that required it.

University computing environments and high-end engineering and scientific workstations are the two other primary markets where IBM clearly recognizes a requirement for Unix.

While IBM obviously prefers to sell its more proprietary operating system and networking alternatives wherever possible, the recent presentation marks a growing awareness of the need for a Unix alternative. By supporting the IEEE Posix efforts, IBM apparently hopes at least to avoid playing according to AT&T's rules and to gain more control over the standard environment.

The IBM RT is now certainly the focus for IBM's Unix-related activity. The Unix V.1-based IBM AIX operating system provides the standard for the development of AIX for the Intel 386-based PS/2 Model 80. Undoubtedly a 370/309X/43XX/9370 version of AIX from IBM is not far away.

The inevitable result of all this, however, is that IBM is necessarily providing users with a Unix (Posix, eventually) alternative to IBM's mainstream, proprietary operating system and application environment. By doing what is necessary to compete in markets that require Unix, IBM makes IBM a more viable alternative to IBM's proprietary environment as well.

It is not surprising, therefore, that Loucks and others indicated that IBM has no near-term intention of building IBM Systems Applications Architecture capabilities into the IBM AIX environment. To do so could open the door to massive defections from IBM proprietary environments to the more standardized AIX environment of Unix/Posix.

Like the opening of Pandora's box, however, IBM's ventures into the Unix realm set loose demons that are not easily contained again.

The inevitable result of all this will be an increasingly easy path from IBM's traditional proprietary software environments into non-proprietary Unix (or Posix) environments. Combined with the PC/DOS-to-Unix path that will be provided by AIX on the PS/2 Model 80 and by similar software on other Intel 386-based systems, the likely result will be a bigger role for Unix and a tougher time keeping users tied to the proprietary operating environments that all systems vendors, including IBM, have counted on to bind their users to them in the past.

William F. Zachmann is vice president of corporate research for International Data Corp., a market research firm owned by the same parent company as InfoWorld. The views expressed are his own.

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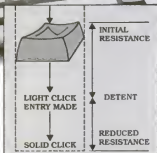
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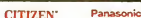
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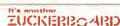
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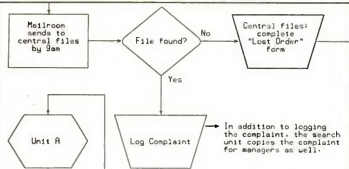
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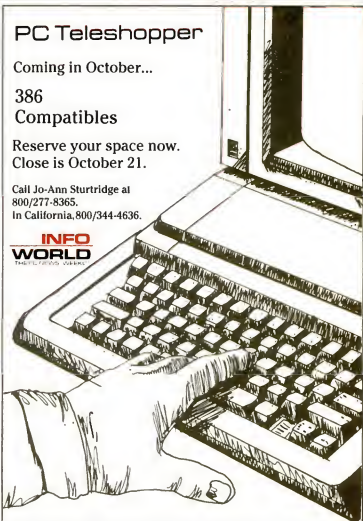
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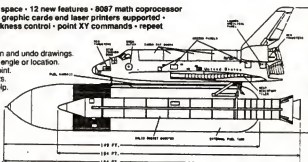
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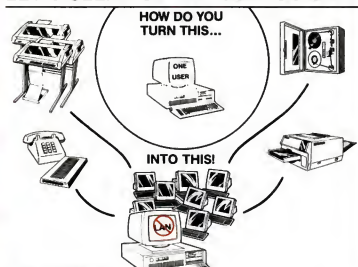
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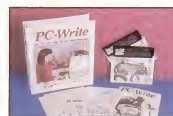
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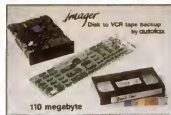


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Issue No.	Cover Date	Ad Close
#40	10/5	9/16
#41	10/12	9/23
#42	10/19	9/30
#43	10/26	10/7
#44	11/2	10/14
#45	11/9	10/21
#46	11/16	10/28
#47	11/23	11/4
#48	11/30	11/10
#49	12/7	11/18
#50	12/14	11/25
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InfoWorld Editorial Calendar

OCTOBER — DECEMBER 1987

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40	Oct. 5	Laser Printers	Sept. 23
41	Oct. 12	Executive Word Processors	Sept. 30
42	Oct. 19	DOS Utilities	Oct. 7
43	Oct. 26	Video Boards (VGA/Expanded EGA)	Oct. 14
44	Nov. 2	386 Compatibles	Oct. 21
45	Nov. 9	Spreadsheets and Expert Systems	Oct. 28
46	Nov. 16	Accounting Software and DOS Shells	Nov. 4
47	Nov. 23	Flat-File and Free-Form Databases	Nov. 10
48	Nov. 30	PC/XT Compatibles	Nov. 18
49	Dec. 7	Communications Software (Macintosh Supplement - Databases)	Nov. 25
50	Dec. 14	Expanded Memory Boards	Dec. 2
51	Dec. 21	Desktop Publishing Software	Dec. 9
52 & 1*	Dec. 28	Laser Printers	Dec. 16

*Combined Issue

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Phoenix Introduces BIOS For Speedier Processors

By Edward Werner

Bringing the IBM PS/2 one step closer to cloning, Phoenix Technologies Ltd. last week announced Basic Input/Output System (BIOS) software that supports several PS/2 features, but not IBM's Micro Channel Architecture.

Phoenix said its Hybrid ROM BIOS Plus supports the 1.44-megabyte and 720K diskette drives and VGA graphics available throughout the PS/2 line. Hybrid also supports the RLL, SCSI, and ESDI-based hard disk controllers available for some PS/2 models.

Jonathan Joseph, director of compatibility software products

for Phoenix, said the Hybrid is compatible with either the IBM PC AT BIOS or the Phoenix BIOS for Intel 80386-based machines, as used in the new Tandy Corp. Model 4000. When used in an 80386-based machine, it supports speeds up to 25 MHz, he added.

Phoenix also announced a number of other PC AT-compatible BIOS programs, which manufacturers of IBM-standard computers license and burn into ROM in their machines.

One of the programs supports the Intel 80286 microprocessor running up to 16 MHz with no wait states, while

another supports 80386-based systems at up to 25 MHz, the company said. Though he acknowledged that no vendor yet markets an 80386 that runs at 25 MHz, Joseph said the BIOS is ready and waiting.

Also announced were ROM BIOS Plus versions for laptop PC compatibles, diskless workstations, network servers, the Chips & Technologies Inc. 16-MHz AT chip set, and 80386-based machines using the Intel 82380 chip, according to Phoenix.

The laptop version offers additional support for low-power-consumption devices and state-of-the-art LCDs. Another ROM BIOS Plus version works with Chips and Technologies' 80386 chip set.

Phoenix Technologies Ltd., 320 Norwood Park S., Norwood, MA 02062; (617) 769-7020.

Lotus

Continued From Page 1

Gould, of Boston's Yankee Group, said Lotus needed to counter the pending release of Microsoft's PC Excel and Borland's Quattro spreadsheets, neither of which will be copy-protected. Also, Paperback Software of Berkeley, California, is dropping copy protection on its Lotus rival VP-Planner. (See story, Page 5.)

Many users were predictably pleased with the decision. "It's about time," said Brian Truhn, a systems analyst with RNC Capital Management Co., in Los Angeles, who said his company's users still have to deal with the key disk requirements of 1-2-3, Version 1A. Until

Lotus recently adopted a more transparent form of copy protection, users had to keep the original 1-2-3 disk in a drive to run the program.

"The user community had an impact," by its complaints, said Jerry Schneider, president of the Washington-based Capitol PC User Group. Now vendors and user groups must educate the public not to pirate software.

Piracy concerns, however, made several corporate micro-computer managers uneasy. "To control a function that's uncontrollable, copy protection helps us," said Danielle Barr, vice president for automation planning at Bank of New England. Barr is concerned that "sloppy" users might duplicate a legal copy of 1-2-3 rather than buying their own.

By changing the key disk

requirement to a more transparent copy protection scheme, Lotus had already answered concerns of Bob Martin, executive support systems manager at Eaton Corp., in Cleveland. He said he has to track several thousand copies of 1-2-3 and Symphony, a harder task when the disks can be freely copied.

Analyst Gould said Lotus will not lose sales to pirates, but he expects vendors of copy protection-defeating software to be the real victims of Lotus' action.

But Craig Gilbert, a partner in an Atlanta-based 1-2-3 after-market developer, warned that "this dropping of copy protection is going to hurt them." Gilbert said his Front Row Systems company has encountered a number of corporate 1-2-3 pirates.

graph of Richardson, Texas, which will announce Windows Designer, a vector-oriented combination drawing and drafting program. The \$695 product supports scanned or bit-mapped imported images, edits polygons and curves by individual points, supports spline and parabolic drawing as well as geometric standards, and allows text and graphics rotation as well as text editing and labeling, said Paul Grayson, Micrografix president.

• An update of Actar, a program development environment from The Whitewater Group of Evanston, Illinois. The new Version 1.1 is fully compatible with Windows 2.0 and other prior releases, and it adds LIM EMS 4.0 support; a debugging window; a change-logging feature; a smaller, faster run time; and an additional 90K of memory for programming, which lets users design "significantly larger applications," said CEO Mark Achler.

• Scan-Do, a \$195 software package that lets user edit grayscale images entered from a scanner, from Hammerlab

Corp. of New Haven, Connecticut. The package, which will ship at fall Comdex, can import a variety of file formats and supports most popular scanners, said company president Brian Hammerstein.

• Da Vinci Systems of Raleigh, North Carolina, will demonstrate a Windows-based E-Mail program designed to run on IBM Token Rings. The program, announced last year, will cost \$99 per workstation. (See "Firm Announces Windows-Based E-Mail Program," May 4.)

• Pentair of Houston will have 10 Windows 2.0 applications running by the end of the year, said Wondra Chang, marketing operations manager. Current programs will be upgraded to Windows 2.0. The \$195 single-user Wintime, an appointment/calendar manager, and the \$1,200-per-server Nettime, a LAN version of Wintime, will be available next month. Other products to follow include the unpriced Windtext, Wintpaint, Wincalc, Wintfont, and Wincscan, Chang said.

Datran Product to Double Hard Disk Storage Capacity

By Mark Brownstein

A hardware/software combination that will double the storage capacity of hard disk drives will be announced by Datran Corp. at Comdex.

The Diskdoubler uses a proprietary compression algorithm stored on the board to compress data written to the hard drive and a decompression algorithm to expand the data to its original form when it is read from disk.

The Diskdoubler performs the data compression/expansion faster than any software designed to perform the same function, according to Otto Cenzano, Datran vice president of engineering. The card, which works on any PC, XT, AT, or compatible computer, fits in a short slot in the system.

The Diskdoubler is compatible with any hard drive con-

troller and works with any hard disk. The Diskdoubler does not require reformatting the disk. "When you install Diskdoubler, it can tell whether a file has been compressed when it reads it. If it can be compressed when written back to the disk, the board will do that," Cenzano said. Since the product does not increase the amount of data actually stored on the hard disk, the problem of exceeding the 32-megabyte DOS limit for a hard drive is avoided. The drive does not change the number of bits actually stored on a hard disk, instead it packs more information in the same drive space.

The suggested list price of the Diskdoubler is \$295.

Datran Corp., 2505 Foothill Blvd., La Crescenta, CA 91214; (818) 248-8780.

Word

Continued From Page 1

inch but can adjust line spacing in very small increments.

To stay on shipping schedule, Word Perfect will delay adding outlining and other user requests to this version, Ashton added.

Easier file sharing over networks is provided, as the program stores default settings of each file in a special file header that is retained as the file moves in a work group. In the current version, a document could change in appearance by users with different margin settings.

Other versions of Word Perfect in development, Ashton said, include:

• The OS/2 version, which—like most other versions—is being written in assembly for speed, Ashton said. Phase 1 will be a character-based product, and Phase 2 will use the Presentation Manager environment

scheduled for OS/2 1.1. He said the printer program will be taken out of Word Perfect itself and made a separate task within the multitasking OS/2, which will let users exit Word Perfect without aborting printing. Such convenience might also be added to future DOS versions, he said.

The Macintosh version, which is now due for release in mid-November, will lack sort and table authorities features found in the PC version, 4.2, but Ashton said the Mac version "has a Version 6.0 look and feel." Exotic features include the capability to place graphic images in a footnote, he said.

• A Unix version, written in C rather than the usual assembler, due out first on the NCR Tower and Hewlett-Packard 3000 series and available in March, Ashton said.

• Enhancements to the Word Perfect Network Library package, adding electronic mail and calendar functions, due out in the first quarter of 1988.

Paradox

Continued From Page 1

Borland.

The first product to ship will be a 386 version of Paradox 2.0. Using the Phar Lap DOS Extender package, the program will break the 640K memory barrier, permitting users to create databases of up to 16 megabytes. In addition, the program will take advantage of the improved instruction set of the 80386, further enhancing speed performance.

"We are not talking about something that will be ready sometime next year," said Borland developer Philippe Kahn. "All the tools are in

place, and this will ship by the end of this calendar year." Benchmarks on beta versions of the program show it is about five times faster than Paradox 2.0 running on a Compaq Deskpro 386, he added.

Versions of Paradox for OS/2, Presentation Manager, Windows 2.0, and Unix, as well as support for SQL, will be available during the first half of 1988, officials said.

To bind these products with the Borland line, the company is working on a developers' tool that will allow programmers to write Paradox applications using Borland Turbo languages. The linking tool will be an extension to the programming language that will include Paradox statements, said Kahn.

Windows

Continued From Page 1

Release 1.04. Windows 386 will also offer an 80386 control software feature that sets up numerous virtual 8086 systems, a technique that implements the 80386 chip's 8086 virtual mode for multitasking of old PC applications, as Microsoft officials explained in previewing the product earlier this year. (See "Microsoft Puts Windows 386 on Display," March 2.)

Current applications such as Lotus 1-2-3, which demand an entire window in Windows 1.04, can even run in the background because it appears to have sole access to the processor.

One analyst suggested Microsoft is positioning 386 Windows to supercede OS/2, as a hedge in case IBM goes off in a proprietary direction with its version or late with its release.

Among the third-party announcements Wednesday:

• Adding to its line of Windows products is Micro-



Forgive Us, Lord, We Know Not What They Do

The Pope was in town, my mailbox was full of overdue bills, and I had a hanger; it was the perfect recipe for guilt. Faced with the prospect of actually changing my lifestyle or simply seeking absolution, I chose the latter and headed for my first visit to the confessional since the morning after that night in the Summer of '59.

RUNNING OUT OF TWO-DIGIT NUMBERS. I told the priest about the PS/2 Model 90, which I had heard was about to pop from Big Blue's labs. It's a dual-processor machine with an 80386 and a RISC chip, maybe even the same one used in the PC

RT. ("You must be certain, my son," said Father Flynn.) Taking advantage of the Micro Channel bus coprocessing capabilities, the Model 90 is supposed to run with virtually all OS/2 software, using OS/2's interprocess communication pipelines to throw graphical and other number crunching back on the RISC chip while the 20-MHz 80386 manages the show. Expect to pay \$15,000 for this honey. Ouch!

OS/2 TO YOU, TOO. I told him the parable of the 200,000 OS/2 disks that have been waiting piously in shrinkwrap for lo, these two months in some IBM ware-

house in South Carolina. Either these disks are junk, or, as I told the good Father, the OS/2 that some developers have found to be less than quick is gonna be the OS/2 for the rest of us, too.

WHAT DID YOU DO THIS SUMMER? Seeking to share the burden of imperfection, I told the Padre that Microsoft can't call its new Works program PC Works because that name is already held by Touchstone Software. Some Microsoft marketing interns, it seems, cut class the day they talked about trademarks.

BUT CAN HE TYPE? Two weeks ago, I

sobbed. I wrote about how Microsoft had used faulty arithmetic in calculating the percentage of defective mice shipped by the company, only to have a number of readers point out that my numbers were wrong, too. "Recalculate and make amends," said Father Flynn. So I fired-up the InfoWorld biomass-powered Cray and learned that .005 percent of 500,000 mice is 25 mice, not 2,500 mice as I said. Then a Microsoft dealer called, claiming that Redmond won't accept returns of faulty mice, so how can they even figure the failure rate?

Among my other sins of days past, I said that Microsoft would introduce Windows 2.0 and Windows Excel this week. WRONG! It's Windows 386 that's coming, with Windows 2.0 and Windows Excel coming in a few weeks. The push for Windows 386 apparently has to do with Compaq needing it for the 20-MHz or Compaq 386 that will be introduced September 29.

Windows 386, by the way, may run like a son of a gun on the Compaq 386, but it won't run at all on the PS/2 Model 80—at least not yet.

BLYNTH SPIRITS. A major sin this week was the I forced a source close to Blyth Software to tell me all about Omnis Quartz, their new super database. Even Father Flynn was impressed by the context-sensitive help windows and scroll boxes. The program also features the capability to import data from another application into those scroll boxes, customizable drop-down menus, and an "incredible" reports generator. Look for this one to appear before the end of the year in a single-user version for \$795, with a multiuser package coming in early '88, followed by a PC/Windows version and a Mac version that will be able to simultaneously access the same data over a Tops network or equivalent.

FAST FRUIT. By this time, Father Flynn probably needed a database to keep track of all my accumulated bad vibes, or maybe he needed a Macintosh II+ (that's right, Mac II+). Look for this baby next year, with a 68030 running at 18.4 MHz and a superfast graphics board from Motorola that uses 16 of the new 68882 floating-point coprocessors to drive a 1,280-by-960 Sony display that even Steve Jobs might respect.

Not that Steve is above consorting with the enemy, either. Several sources wanted to be the first to tell me about Next's secret pact with Atari for some sharing of custom graphics chips. Look for the first product of this unholy alliance at Atari's Comdex booth.

YOU CAN DRESS 'EM UP... "Are all of these personal computer people as bad as you?" asked Father Flynn. What could I say? I told the good father about Philippe Kahn's performance at Borland's first press conference since concluding its merger with Ansa. Dressed in a blue suit and a loud tie, Kahn said that while Borland is going strongly after the Fortune 1000 market now. "This doesn't mean we'll be a bunch of corporate a*****, just that I will wear a tie to press conferences." "Did he really say a*****?" asked Father Flynn.

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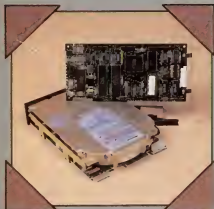


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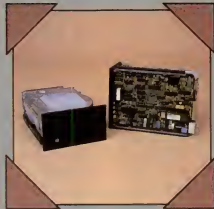
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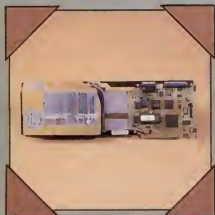
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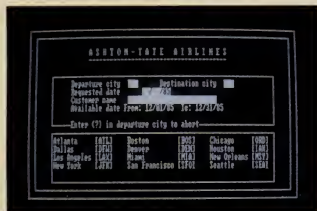
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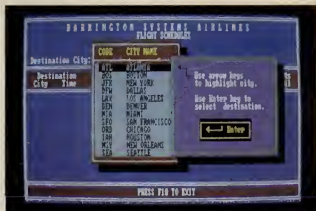
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